

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TESLA, INC.,  
Petitioner,

v.

AUTONOMOUS DEVICES, LLC,  
Patent Owner.

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IPR2023-01173  
Patent 11,055,583 B1

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Before BARBARA A. PARVIS, ROBERT J. WEINSCHENK, and  
RUSSELL E. CASS, *Administrative Patent Judges*.

WEINSCHENK, *Administrative Patent Judge*.

JUDGMENT  
Final Written Decision  
Determining All Challenged Claims Unpatentable  
*35 U.S.C. § 318(a)*

## I. INTRODUCTION

### A. *Background and Summary*

Tesla, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting an *inter partes* review of claims 10, 11, 25, 27, and 30 (“the challenged claims”) of U.S. Patent No. 11,055,583 B1 (Ex. 1001, “the ’583 patent”). Autonomous Devices, LLC (“Patent Owner”) filed a Preliminary Response (Paper 11, “Prelim. Resp.”) to the Petition. We instituted an *inter partes* review of the challenged claims on January 8, 2024. Paper 21 (“Dec. on Inst.”), 20. After institution, Patent Owner filed a Response (Paper 27, “PO Resp.”) to the Petition, Petitioner filed a Reply (Paper 32, “Pet. Reply”) to the Response, and Patent Owner filed a Sur-reply (Paper 34, “PO Sur-reply”) to the Reply. We held an oral hearing on October 3, 2024, and a transcript of the hearing is included in the record. Paper 39 (“Tr.”).

For the reasons set forth below, Petitioner has shown by a preponderance of the evidence that claims 10, 11, 25, 27, and 30 of the ’583 patent are unpatentable.

### B. *Real Parties in Interest*

The parties identify themselves as the only real parties in interest. Pet. 1; Paper 5, 1.

### C. *Related Matters*

The parties indicate that the ’583 patent is the subject of the following district court case: *Autonomous Devices, LLC v. Tesla, Inc.*, No. 22-cv-1466 (D. Del.) (“District Court Litigation”). Pet. 1; Paper 5, 1. The parties indicate that the ’583 patent is the subject of another petition for *inter partes* review in IPR2023-01172. Paper 1, 1; Paper 5, 2. The parties also indicate that other patents in the District Court Litigation are the subject of petitions

for *inter partes* review in IPR2023-01054, IPR2023-01055, IPR2023-01169, IPR2023-01170, and IPR2023-001171. Pet. 1; Paper 5, 1–2.

*D. The '583 Patent*

The '583 patent relates to “machine learning for computing enabled systems and/or devices.” Ex. 1001, code (57). The '583 patent states that “[a] machine learning solution is needed for computing enabled systems and/or devices to be less dependent on or fully independent from user input.” *Id.* at 1:37–39. The '583 patent describes a system for “learning and/or using visual surrounding for autonomous device operation” comprising “learning one or more digital pictures of a device’s surrounding along with correlated instruction sets for operating the device, storing this knowledge in a knowledgebase (i.e. neural network, graph, sequences, etc.), and autonomously operating a device.” *Id.* at 59:10–18.

*E. Illustrative Claim*

Of the challenged claims, claim 10, which depends from claims 1 and 4, is illustrative. Claims 1, 4, and 10 are reproduced below.

1. A system comprising:
  - one or more processors; and
  - one or more non-transitory machine readable media storing machine readable code that, when executed by the one or more processors, causes the one or more processors to perform at least:
    - receiving or generating a first one or more digital pictures, wherein the first one or more digital pictures depict at least a portion of a first device’s surrounding;
    - receiving or generating a first one or more instruction sets for operating the first device; and

learning the first one or more digital pictures correlated with the first one or more instruction sets for operating the first device.

Ex. 1001, 160:41–54.

4. The system of claim 1, wherein the machine readable code, when executed by the one or more processors, causes the one or more processors to further perform at least:

receiving or generating a new one or more digital pictures;

determining the first one or more instruction sets for operating the first device based on at least partial match between the new one or more digital pictures and the first one or more digital pictures; and

at least in response to the determining, causing the first device or a second device to perform one or more operations defined by the first one or more instruction sets for operating the first device.

*Id.* at 161:15–27.

10. The system of claim 4, wherein the first one or more digital pictures correlated with the first one or more instruction sets for operating the first device are included in a knowledgebase, and wherein the knowledgebase further includes a second one or more digital pictures correlated with a second one or more instruction sets for operating the first device, and wherein at least a portion of the first one or more digital pictures or at least a portion of the first one or more instruction sets for operating the first device is learned in a first learning process that includes operating the first device at least partially by a first user, and wherein at least a portion of the second one or more digital pictures or at least a portion of the second one or more instruction sets for operating the first device is learned in a second learning process that includes operating the first device at least partially by a second user.

*Id.* at 162:4–20.

*F. Evidence*

Petitioner submits the following evidence:

<b>Evidence</b>	<b>Exhibit No.</b>
Declaration of Jason Janet (“Janet Declaration”)	1003
Grotmol, US 9,604,359 B1, issued Mar. 28, 2017 (“Grotmol”)	1005
Hickman, US 8,639,644 B1, issued Jan. 28, 2014 (“Hickman”)	1007
Hoffman, US 9,283,674 B2, issued Mar. 15, 2016 (“Hoffman”)	1009
Supplemental Declaration of Dr. Jason Janet (“Janet Supplemental Declaration”)	1010

Patent Owner submits the Declaration of Dr. Eli Saber, Ph.D. Ex. 2007 (“Saber Declaration”).

*G. Asserted Grounds*

Petitioner asserts that the challenged claims are unpatentable on the following grounds:

<b>Claim(s) Challenged</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>
10, 11	103 <sup>1</sup>	Grotmol <sup>2</sup>
25, 27	103	Grotmol, Hickman
30	103	Grotmol, Hoffman

II. ANALYSIS

*A. Legal Standards*

A claim is unpatentable as obvious if the differences between the claimed invention and the prior art are such that the claimed invention as a

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<sup>1</sup> The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103. Based on the effective filing date of the ’583 patent, we apply the AIA version of § 103.

<sup>2</sup> Petitioner also relies on the knowledge of a person of ordinary skill in the art. Pet. 4.

whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. 35 U.S.C. § 103 (2011). The question of obviousness is resolved on the basis of underlying factual determinations, including 1) the scope and content of the prior art; 2) any differences between the claimed subject matter and the prior art; 3) the level of ordinary skill in the art; and 4) any objective indicia of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

*B. Level of Ordinary Skill in the Art*

Petitioner argues that a person of ordinary skill in the art would have had “(1) a bachelor’s degree in electrical engineering, computer engineering, computer science, systems engineering, or equivalent course work with two to three years of work experience in computer vision, image/video processing, and/or machine learning; or (2) a master’s degree in electrical engineering, computer engineering, computer science, systems engineering, or equivalent course work with a focus in computer vision, image/video processing, and/or machine learning.” Pet. 3–4 (citing Ex. 1003 ¶ 41). Petitioner’s description of the level of ordinary skill in the art is supported by the testimony of Petitioner’s declarant, Dr. Jason Janet. Ex. 1003 ¶ 41. Patent Owner “adopts” Petitioner’s description of the level of ordinary skill in the art. PO Resp. 5. We also adopt Petitioner’s description for the purposes of this Decision.

*C. Claim Construction*

In an *inter partes* review proceeding, a patent claim is construed using the same standard used in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary

meaning of the claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b). Neither party proposes an express construction for any claim terms. Pet. 5; PO Resp. 9. We determine that no claim terms require an express construction to resolve the parties' disputes regarding the asserted grounds of unpatentability. *See* Sections II.D–II.F.

*D. Obviousness of Claims 10 and 11 over Grotmol*

Petitioner argues that claims 10 and 11 would have been obvious over Grotmol.<sup>3</sup> Pet. 12–26. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claims 10 and 11 would have been obvious over Grotmol. Claims 10 and 11 both depend from claims 1 and 4. Ex. 1001, 162:4–36. We address the limitations of claims 1 and 4 below. *See* Sections II.D.2, II.D.3.

*1. Overview of Grotmol*

Grotmol relates to “[a]n apparatus and methods for training and/or operating a robotic device to follow a trajectory.” Ex. 1001, code (57). Grotmol’s “robotic vehicle may utilize a camera and store[] the sequence of images of a visual scene seen when following a trajectory during training in an ordered buffer.” *Id.* Grotmol’s robotic vehicle may also store “[m]otor commands associated with a given image.” *Id.* “During autonomous operation, an acquired image may be compared with one or more images from the training buffer in order to determine the most likely match.” *Id.*

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<sup>3</sup> Petitioner also relies on the knowledge of a person of ordinary skill in the art. Pet. 12.

2. *Claim 1*

Claim 1 recites “one or more processors.” Ex. 1001, 160:42. Grotmol teaches a processor. Pet. 12–13; Ex. 1005, 3:27–30, 8:5–15, Fig. 7. Patent Owner does not dispute that Grotmol teaches this limitation of claim 1.

Claim 1 recites “one or more non-transitory machine readable media storing machine readable code . . . executed by the one or more processors.” Ex. 1001, 160:43–46. Grotmol teaches a non-transitory computer-readable storage medium having instructions executed by the processor. Pet. 13–14; Ex. 1005, 4:13–17, 33:14–30, 49:4–50:13. Patent Owner does not dispute that Grotmol teaches this limitation of claim 1.

Claim 1 recites “receiving or generating a first one or more digital pictures, wherein the first one or more digital pictures depict at least a portion of a first device’s surrounding.” Ex. 1001, 160:47–49. Grotmol teaches receiving a first image of a first robot’s visual scene when following a trajectory. Pet. 14–15; Ex. 1005, code (57), 3:27–39, 8:57–9:3, 10:16–22, 38:28–60, 39:13–22, Fig. 20A. Patent Owner does not dispute that Grotmol teaches this limitation of claim 1.

Claim 1 recites “receiving or generating a first one or more instruction sets for operating the first device.” Ex. 1001, 160:50–51. Grotmol teaches receiving a first motor command for causing the first robot to execute an action. Pet. 15; Ex. 1005, code (57), 3:27–39, 33:14–30, 39:17–19. Patent Owner does not dispute that Grotmol teaches this limitation of claim 1.

Claim 1 recites “learning the first one or more digital pictures correlated with the first one or more instruction sets for operating the first device.” Ex. 1001, 160:52–54. Grotmol teaches correlating the first image with the first motor command in a training buffer. Pet. 15–18; Ex. 1005,



code (57), 3:27–39, 23:4–29, 24:17–20, 24:57–61, 33:14–30, 33:59–62, 34:50–55, 39:17–19, 43:6–9. Patent Owner does not dispute that Grotmol teaches this limitation of claim 1.

3. *Claim 4*

Claim 4 depends from claim 1, and recites “receiving or generating a new one or more digital pictures.” Ex. 1001, 161:18–19. Grotmol teaches receiving a new image. Pet. 18–19; Ex. 1005, code (57), 10:15–20, 38:51–58, 39:23–26. Patent Owner does not dispute that Grotmol teaches this limitation of claim 4.

Claim 4 also recites “determining the first one or more instruction sets for operating the first device based on at least partial match between the new one or more digital pictures and the first one or more digital pictures.” Ex. 1001, 161:20–23. Grotmol teaches determining the first motor command based on an at least partial match between the new image and the first image stored in the training buffer. Pet. 19–21; Ex. 1005, code (57), 3:14–16, 4:30–38, 28:19–24, 41:8–13, 43:5–9. Patent Owner does not dispute that Grotmol teaches this limitation of claim 4.

Claim 4 recites “at least in response to the determining, causing the first device or a second device to perform one or more operations defined by the first one or more instruction sets for operating the first device.” Ex. 1001, 161:24–27. Grotmol teaches causing the first robot to perform actions defined by the determined first motor command. Pet. 21–23; Ex. 1005, code (57), 2:34–41, 3:12–13, 28:19–40, 43:4–11. Patent Owner does not dispute that Grotmol teaches this limitation of claim 4.

4. *Claim 10*

Claim 10 depends from claim 4, and recites

wherein the first one or more digital pictures correlated with the first one or more instruction sets for operating the first device are included in a knowledgebase, and wherein the knowledgebase further includes a second one or more digital pictures correlated with a second one or more instruction sets for operating the first device, and wherein at least a portion of the first one or more digital pictures or at least a portion of the first one or more instruction sets for operating the first device is learned in a first learning process that includes operating the first device at least partially by a first user, and wherein at least a portion of the second one or more digital pictures or at least a portion of the second one or more instruction sets for operating the first device is learned in a second learning process that includes operating the first device at least partially by a second user.

Ex. 1001, 162:4–20. Grotmol teaches that the first robot’s training buffer includes the first image correlated with the first motor command (i.e., a first training set) learned in a first learning process, as well as a second image correlated with a second motor command (i.e., a second training set) learned in a second learning process. Pet. 23–25; Ex. 1005, code (57), 3:27–39, 8:66–9:3, 10:23–26, 23:3–11, 24:17–67, 26:1–20, 38:36–58, 39:13–22. The evidence of record indicates that it would have been obvious that the first robot learns the first training set when a first user operates the first robot and learns the second training set when a second user operates the first robot. Pet. 25; Ex. 1003 ¶¶ 340–341; Ex. 1005, 23:3–11, 24:17–67, 26:1–20, 39:13–22.

Patent Owner argues that Petitioner does not show sufficiently that Grotmol teaches a second learning process. PO Resp. 11; PO Sur-reply 3–6. Specifically, Patent Owner contends that “Grotmol only discloses *one* user

operating *one* device in *one* learning process, . . . and therefore fails to disclose any second learning process.” PO Resp. 11 (citing Ex. 2007 ¶¶ 123–130). Patent Owner also contends that Petitioner’s reliance on “Grotmol’s discussion of training multiple complex behaviors” is insufficient because “Grotmol explains that the single user trains the device in a single learning process to learn a single task involving fetching.”<sup>4</sup> PO Sur-reply 5 (citing Ex. 1005, 25:30–26:34) (emphasis omitted).

Patent Owner’s arguments are unavailing. Grotmol teaches that “[t]he system may be configured to learn” a first behavior from a user. Ex. 1005, 25:30–42. Grotmol also teaches that “[a]fter [the] user is done training a particular behavior, he may *create another module* and activate it” so that “[t]he system may be configured to learn [a] second behavior from the user.” *Id.* at 26:1–8 (emphasis added). Thus, Grotmol teaches that a user trains a first behavior and then creates a second module (i.e., a second learning process) for training a second behavior.<sup>5</sup> *Id.* at 25:30–42, 26:1–8; Ex. 1003 ¶ 340.

Patent Owner also argues that Petitioner does not show sufficiently that it would have been obvious that a second learning process includes

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<sup>4</sup> For claims 10 and 11, Patent Owner asserts that Petitioner improperly relies on Grotmol’s teaching of “multiple controllers” and “other references” for the first time in the Reply. PO Sur-reply 2–4, 7–8, 13. We do not rely on the identified arguments from the Reply in this Decision. Thus, we need not decide whether the identified arguments present an improper new theory of unpatentability.

<sup>5</sup> To the extent Patent Owner argued at the oral hearing that claims 10 and 11 require two “different way[s]” of learning behaviors, Patent Owner does not present that argument in the Response or Sur-reply. Tr. 39:9–41:11; *see* PO Resp. 10–20; PO Sur-reply 3–15. Further, Patent Owner does not identify specific evidence to support that interpretation. *See* Tr. 39:9–41:11.

operating the first device at least partially by a second user. PO Resp. 10–16; PO Sur-reply 3–10. Patent Owner contends that Petitioner “provides no reasoned basis for its obviousness argument.” PO Resp. 11 (citing Ex. 2007 ¶¶ 124–130) (emphasis omitted); *see* PO Sur-reply 8. Specifically, Patent Owner contends that “[n]othing in Grotmol suggests that one user trains the robot for a task of one level of complexity and another user trains the robot for a task of another level of complexity.” PO Resp. 13 (citing Ex. 2007 ¶¶ 128–130) (emphasis omitted); *see* PO Sur-reply 6–7. According to Patent Owner, “[u]sing different users with a device in different learning processes to learn mixed knowledge into a single knowledgebase would not have been straightforward or unusually simple to a [person of ordinary skill in the art (“POSA”)] due to the complexities of combining the mixed knowledge into a single knowledgebase.” PO Resp. 14 (citing Ex. 2007 ¶¶ 128–130) (emphasis omitted); *see* PO Sur-reply 9.

Patent Owner’s arguments are unavailing. Grotmol teaches that a user may train a robot to learn “simple” and “complex” tasks. Ex. 1005, 24:17–23. The evidence of record indicates that a person of ordinary skill in the art would have known to use different trainers “to train behaviors involving different levels of complexity in order to take advantage of the varying skills and knowledge of trainers.” Ex. 1003 ¶ 341. Thus, based on Grotmol’s teaching that a robot can learn both simple and complex tasks, a person of ordinary skill in the art would have had a specific reason for different users to train Grotmol’s robot for different behaviors, namely, to benefit from the users’ varying skills and knowledge. Pet. 25; Ex. 1003 ¶ 341; Ex. 1005, 24:17–23.

Grotmol also teaches that a user may train a robot “using a gamepad (or other input device . . . ).” Ex. 1005, 26:9–13; *see id.* at 33:18–21. The evidence of record indicates that “switching users would be as simple as handing off a gamepad or other remote device used for controlling the robot from one user to another.” Ex. 1010 ¶ 73. Neither Patent Owner nor its declarant, Dr. Eli Saber, explains specifically why handing Grotmol’s gamepad to a different user would have created “complexities of combining the mixed knowledge into a single knowledgebase” or required “identifying each user to store particular learned operations and preferences in portions of the knowledgebase for user-specific autonomous operations.” *See* PO Resp. 14–15; PO Sur-reply 9; Ex. 2007 ¶¶ 128–130. Thus, based on Grotmol’s teaching of using a gamepad to train a robot, it would have been simple and straightforward for different users to train Grotmol’s robot for different behaviors. Ex. 1005, 26:9–13, 33:18–21; Ex. 1010 ¶ 73.

Lastly, Patent Owner argues that Petitioner “failed to perform a proper obviousness analysis” because Petitioner failed “to specifically identify any claimed features that are not disclosed in Grotmol.” PO Resp. 44–48 (citing Pet. 12–27; Ex. 2008, 54:22–55:3); *see id.* at 15–16; PO Sur-reply 10. Patent Owner’s argument is unavailing. Petitioner asserts in the Petition that “Grotmol discloses that a human trainer (‘user’) can operate a robot during a training process,” and it would have been obvious to use different trainers “to train behaviors involving different levels of complexity.” Pet. 24–25 (citing Ex. 1003 ¶¶ 340–341). Thus, Petitioner explains that Grotmol only

teaches a user<sup>6</sup> and provides evidence that it would have been obvious for different users to train Grotmol's robot for different behaviors. *Id.*; Ex. 1003 ¶¶ 340–341.

5. *Claim 11*

Claim 11 depends from claim 4, and recites

wherein the first one or more digital pictures correlated with the first one or more instruction sets for operating the first device are included in a knowledgebase, and wherein the knowledgebase further includes a second one or more digital pictures correlated with a second one or more instruction sets for operating a third device, and wherein at least a portion of the first one or more digital pictures or at least a portion of the first one or more instruction sets for operating the first device is learned in a first learning process that includes operating the first device at least partially by a first user, and wherein at least a portion of the second one or more digital pictures or at least a portion of the second one or more instruction sets for operating the third device is learned in a second learning process that includes operating the third device at least partially by: the first user, or a second user.

Ex. 1001, 162:21–36. Grotmol teaches that the first robot's training buffer includes the first image correlated with the first motor command (i.e., a first training set) learned in a first learning process when a first user operates the first robot. Pet. 24–26; Ex. 1005, code (57), 3:27–39, 8:66–9:3, 10:23–26, 38:36–58, 39:13–22. The evidence of record indicates that it would have been obvious that the first robot's training buffer includes a second image correlated with a second motor command (i.e., a second training set) learned

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<sup>6</sup> Petitioner's declarant, Dr. Jason Janet, confirmed during his deposition that Grotmol does not "explicitly mention word for word a second user." Ex. 2008, 55:3–6.

in a second learning process when the first user operates a third robot.  
Pet. 24–26; Ex. 1003 ¶¶ 342–343; Ex. 1005, 24:17–67, 26:1–20, 33:12–58.

Patent Owner argues that Petitioner does not show sufficiently that Grotmol teaches a second learning process. PO Resp. 16–18; PO Sur-reply 10–11. Patent Owner’s argument is unavailing. As discussed above for claim 10, Grotmol teaches a second learning process. *See* Section II.D.4.

Patent Owner also argues that Petitioner does not show sufficiently that it would have been obvious that a second learning process includes operating a third device at least partially by the first user. PO Resp. 17–20; PO Sur-reply 11–15. Patent Owner contends that Petitioner’s evidence “describes a situation involving multiple trained configurations each stored and learned on a different robot, whereas claim 11 specifically recites a single knowledgebase . . . that includes mixed knowledge of one correlation learned in one learning process . . . involving one device and an additional correlation learned in a second learning process involving a third device.” PO Resp. 18 (citing Ex. 2007 ¶¶ 134–136) (emphasis omitted). According to Patent Owner, “[u]sing multiple learning processes to learn mixed knowledge involving different devices into a single knowledgebase would not have been straightforward or unusually simple to a POSA due to the complexities of combining the mixed knowledge involving different devices into a single knowledgebase.” *Id.* at 19 (citing Ex. 2007 ¶¶ 135–136) (emphasis omitted); *see* PO Sur-reply 13. Patent Owner also contends that “the portions of Grotmol cited by Petitioner only disclose that a trained configuration can be loaded from one robot to another robot,” which “is fundamentally different than learning by operating the second device.” PO Sur-reply 11–12 (citing Ex. 1005, 33:30–32) (emphasis omitted).

Patent Owner’s arguments are unavailing. Grotmol teaches that a robot may correlate an image with a motor command “based on the user observing the robot’s actions and sending one or more target control commands to the robot,” *or* a “trained configuration may be loaded to one or more other robots in order to provide learned behaviors.” Ex. 1005, 33:21–32. The evidence of record indicates that a person of ordinary skill in the art would have known to load Grotmol’s robot “with a second, third, or more configurations trained on other robots” to “increase the amount of training that could be done” and “maximize performance.” Ex. 1003 ¶¶ 343. Thus, based on Grotmol’s teaching of loading a training set from one robot to another, a person of ordinary skill in the art would have had a specific reason to load Grotmol’s robot with a training set learned in another learning process when the user operates another robot. Ex. 1003 ¶¶ 342–343; Ex. 1005, 33:21–32.

Further, Grotmol teaches that a robot’s “memory component may be configured to store *training sets*.” Ex. 1005, 3:35–39 (emphasis added). In other words, Grotmol’s robot can store multiple training sets, whether learned from a user command or loaded from another robot. *Id.*; Ex. 1010 ¶ 79. Neither Patent Owner nor its declarant, Dr. Saber, explains specifically why storing multiple training sets would have created “complexities of combining the mixed knowledge involving different devices into a single knowledgebase.” *See* PO Resp. 19; PO Sur-reply 13; Ex. 2007 ¶¶ 135–136. Thus, based on Grotmol’s teaching of storing multiple training sets in memory, it would have been simple and straightforward for Grotmol’s robot to store one training set learned from a



user command and another training set loaded from another robot operated by the user.<sup>7</sup> Ex. 1005, 3:35–39, 33:21–32; Ex. 1010 ¶ 79.

Lastly, Patent Owner argues that Petitioner “failed to perform a proper obviousness analysis” because Petitioner failed “to specifically identify any claimed features that are not disclosed in Grotmol.” PO Resp. 44–48 (citing Pet. 12–27; Ex. 2008, 59:23–60:2); *see id.* at 20; PO Sur-reply 15. Patent Owner’s argument is unavailing. Petitioner asserts in the Petition that Grotmol teaches that a “trained configuration may be loaded to one or more *other robots* in order to provide learned behaviors,” and it would have been obvious to load Grotmol’s robot “with a second, third, or more configurations trained on other robots.” Pet. 26 (citing Ex. 1003 ¶¶ 342–343). Thus, Petitioner explains that Grotmol only teaches generally loading a training set from one robot to another and provides evidence that it would have been obvious for Grotmol’s robot to store one training set learned from a user command and another training set loaded from another robot operated by the user.<sup>8</sup> *Id.*; Ex. 1003 ¶¶ 342–343.

#### 6. Summary

For the foregoing reasons, Petitioner has shown by a preponderance of the evidence that claims 10 and 11 would have been obvious over Grotmol.

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<sup>7</sup> For claim 11, Patent Owner asserts that Petitioner improperly relies on Grotmol’s “undo mode” for the first time in the Reply. PO Sur-reply 12–13. We do not rely on the identified argument from the Reply in this Decision. Thus, we need not decide whether the identified argument presents an improper new theory of unpatentability.

<sup>8</sup> Petitioner’s declarant, Dr. Janet, confirmed during his deposition that there is a “delta” between Grotmol and claim 11 for which “the obviousness analysis was probably useful.” Ex. 2008, 59:23–60:6.

*E. Obviousness of Claims 25 and 27 over Grotmol and Hickman*

Petitioner argues that claims 25 and 27 would have been obvious over Grotmol and Hickman. Pet. 27–37. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claims 25 and 27 would have been obvious over Grotmol and Hickman. Claims 25 and 27 both depend from claims 1 and 4. Ex. 1001, 166:4–15, 166:44–64. We address the limitations of claims 1 and 4 above. *See* Sections II.D.2, II.D.3.

*1. Overview of Hickman*

Hickman relates to “shared robot knowledge bases for use with cloud computing systems.” Ex. 1007, code (57). Hickman teaches that the “information in the shared robot knowledge bases is updated based on robot experiences so that any particular robot may benefit from prior experiences of other robots.” *Id.*

*2. Claim 25*

Claim 25 depends from claim 4, and recites

a server that receives from the first device at least one of: the first one or more digital pictures, or the first one or more instruction sets for operating the first device, and wherein the second device receives from the server at least one of: the first one or more digital picture % or the first one or more instruction sets for operating the first device, and wherein the second device is caused to perform the one or more operations defined by the first one or more instruction sets for operating the first device.

Ex. 1001, 166:4–15. Grotmol teaches loading the first image correlated with the first motor command (i.e., a first training set) from the first robot to the second robot. Pet. 30–31; Ex. 1005, code (57), 16:2–14, 33:12–58. Grotmol also teaches that the second robot performs an operation defined by the first motor command in the first training set. Pet. 31; Ex. 1005, code (57),

33:24–35. Hickman teaches a shared robot knowledgebase accessible via a server. Pet. 31–33; Ex. 1007, code (57), 5:7–11, 5:20–23, 26:21–27:21, 29:33–41, Fig. 6. The evidence of record indicates that it would have been obvious to combine the teachings of Grotmol and Hickman so that Grotmol’s first robot sends the first training set to Hickman’s shared knowledgebase and Grotmol’s second robot receives the first training set from Hickman’s shared knowledgebase. Pet. 33; Ex. 1003 ¶¶ 356–357; *see* Section II.E.4.

Patent Owner argues that Petitioner does not show sufficiently that the Grotmol and Hickman combination teaches that the second device receives the first digital picture or first instruction set from a server and performs operations defined by the first instruction set. PO Resp. 25–27; PO Sur-reply 19. Patent Owner contends that “Hickman’s simple knowledgebase that includes uncorrelated images and instructions never mentions or discloses anything like the concept of a correlation with an instruction set for operating a first device that is used to operate a second device involving a server.” PO Resp. 26 (citing Ex. 2007 ¶¶ 145–146) (emphasis omitted). According to Patent Owner, claim 25 “requires a sophisticated approach where knowledge is stored and processed using instruction sets correlated with a digital picture in a specific manner and ultimately transferred from one device to be used on another device,” and “neither reference discloses the specifically claimed devices operating using correlations in the claimed manner.” *Id.* at 26–27 (citing Ex. 2007 ¶¶ 146–147) (emphasis omitted); *see* PO Sur-reply 19.

Patent Owner’s arguments are unavailing. Patent Owner addresses Grotmol and Hickman individually, not the combination of Grotmol and

Hickman. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (“[O]ne cannot show non-obviousness by attacking references individually where, as here, the rejections are based on combinations of references.”). Specifically, Grotmol teaches correlating an image with a motor command in a training set and then loading the training set from one robot to another robot. Pet. 15–18, 30–31; Ex. 1005, code (57), 3:27–39, 16:2–14, 23:4–29, 24:17–20, 24:57–61, 33:12–58, 33:59–62, 34:50–55, 39:17–19, 43:6–9. Hickman teaches sharing information between robots using a server. Pet. 31–33; Ex. 1007, code (57), 5:7–11, 5:20–23, 26:21–27:21, 29:33–41, Fig. 6. Thus, in the proposed combination, Grotmol’s robot sends a training set to another robot using Hickman’s server. Pet. 33; Ex. 1003 ¶¶ 356–357.

### 3. Claim 27

Claim 27 depends from claim 4, and recites “wherein the first one or more digital pictures correlated with the first one or more instruction sets for operating the first device are included in a knowledgebase, and wherein the knowledgebase further includes a second one or more digital pictures correlated with a second one or more instruction sets for operating a third device.” Ex. 1001, 166:44–50. Grotmol teaches correlating the first image with the first motor command (i.e., a first training set) for operating the first robot, and it would have been obvious to correlate a second image with a second motor command (i.e., a second training set) for operating a third robot. Pet. 23–26, 34; Ex. 1003 ¶¶ 342–343; Ex. 1005, code (57), 3:27–39, 8:66–9:3, 10:23–26, 33:12–58, 38:36–58, 39:13–22. Hickman teaches a shared robot knowledgebase. Pet. 34–35; Ex. 1007, code (57), 23:36–48, 26:21–27:21. The evidence of record indicates that it would have been obvious to combine the teachings of Grotmol and Hickman so that

Hickman’s shared robot knowledgebase includes Grotmol’s first and second training sets. Pet. 35; Ex. 1003 ¶¶ 360–361; *see* Section II.E.4.

Patent Owner argues that Petitioner does not show sufficiently that the Grotmol and Hickman combination teaches a knowledgebase including the first digital picture correlated to the first instruction set for operating the first device and the second digital picture correlated to the second instruction set for operating a third device. PO Resp. 28–30; PO Sur-reply 20–21. Patent Owner contends that “Grotmol discloses one user operating one device in one learning process, and even when loaded into a second device, this is still knowledge of one user operating one device in one learning process that does not disclose a correlation that includes instruction sets for operating a third device.” PO Resp. 30 (citing Ex. 2007 ¶¶ 151–152).

Patent Owner’s arguments are unavailing. As discussed above for claim 10, Grotmol teaches a second learning process. *See* Section II.D.4; Pet. 34 (“As described above in Ground[] 1”). And, as discussed above for claim 11, based on Grotmol’s teaching of loading a training set from one robot to another, a person of ordinary skill in the art would have had a specific reason to load Grotmol’s robot with a second training set learned in a second learning process when the user operates a third robot. *See* Section II.D.5; Pet. 34 (“As described above in Ground[] 1”).

Claim 27 also recites “receiving or generating an additional one or more digital pictures.” Ex. 1001, 166:53–54. Grotmol teaches receiving a new image. Pet. 18–19, 36; Ex. 1005, code (57), 10:15–20, 38:51–58, 39:23–26. Patent Owner does not dispute that the Grotmol and Hickman combination teaches this limitation of claim 27.

Claim 27 recites “determining the second one or more instruction sets for operating the third device based on at least partial match between the additional one or more digital pictures and the second one or more digital pictures; and at least in response to the determining the second one or more instruction sets for operating the third device, causing a fourth device to perform one or more operations defined by the second one or more instruction sets for operating the third device.” Ex. 1001, 166:55–64. Grotmol teaches determining the second motor command based on an at least partial match between the new image and the second image stored in the training buffer. Pet. 19–21, 36; Ex. 1005, code (57), 3:14–16, 4:30–38, 28:19–24, 41:8–13, 43:5–9. Grotmol also teaches causing a robot to perform actions defined by the second motor command. Pet. 21–23, 36; Ex. 1005, code (57), 2:34–41, 3:12–13, 28:19–40, 43:4–11. Hickman teaches a shared robot knowledgebase. Pet. 34–37; Ex. 1007, code (57), 23:36–48, 26:21–27:21. The evidence of record indicates that it would have been obvious to combine the teachings of Grotmol and Hickman so that a fourth robot receives Grotmol’s second training set from Hickman’s shared robot knowledgebase and performs actions defined by the second motor command. Pet. 36–37; Ex. 1003 ¶¶ 363–364; *see* Section II.E.4.

Patent Owner argues that Petitioner does not show sufficiently that the Grotmol and Hickman combination teaches determining the second instruction set for operating the third device based on an at least partial match between the additional digital picture and the second digital picture, or causing a fourth device to perform operations defined by the second instruction set. PO Resp. 30–35; PO Sur-reply 20–21. Patent Owner contends that Grotmol teaches “one user operating one device in one

learning process that does not disclose instruction sets for operating a third device” or “causing a specific fourth device to perform operations defined by the instruction sets for operating the specific third device.” PO Resp. 30–32 (citing Ex. 2007 ¶¶ 152–157) (emphasis omitted). Patent Owner also contends that “Hickman does not disclose or suggest any correlations including any instruction sets.” *Id.* at 32. According to Patent Owner, Petitioner “fail[s] to map specific disclosures of the references to the actual language of claim 27.” *Id.* at 33–34 (citing Ex. 2007 ¶¶ 156–157) (emphasis omitted); *see* PO Sur-reply 20–21.

Patent Owner’s arguments are unavailing. Patent Owner addresses Grotmol and Hickman individually, not the combination of Grotmol and Hickman. *See Keller*, 642 F.2d at 426. As discussed above, Grotmol teaches determining a motor command based on an at least partial match between a new image and a stored image and causing a robot to perform the determined motor command. Ex. 1005, code (57), 2:34–41, 3:12–16, 4:30–38, 28:19–24, 41:8–13, 43:4–11. Hickman teaches a shared robot knowledgebase accessible to “any particular robot.” Ex. 1007, code (57), 23:36–48, 26:21–27:21. The evidence of record indicates that it would have been obvious to include Grotmol’s training sets in Hickman’s shared robot knowledgebase so that the training sets are accessible to any robot (e.g., a fourth robot). Ex. 1003 ¶¶ 363–364. Thus, in the proposed combination, a fourth robot receives a training set from the shared robot knowledgebase, determines the motor command based on the training set, and performs the determined motor command. *Id.*

#### 4. Reason to Combine

Petitioner asserts that a person of ordinary skill in the art would have had reason to combine the cited teachings of Grotmol and Hickman. Pet. 27–30 (citing Ex. 1003 ¶¶ 159–166). We agree with Petitioner’s rationale. Specifically, it would have been obvious to a person of ordinary skill in the art to combine Grotmol and Hickman so that Grotmol’s robots share training sets using Hickman’s shared robot knowledgebase. *Id.* at 30; Ex. 1003 ¶ 166. Doing so would have been obvious because Grotmol teaches sharing training sets between robots, and Hickman’s shared robot knowledgebase would facilitate wider and faster sharing of Grotmol’s training sets. Pet. 27–29; Ex. 1003 ¶¶ 160–161, 164; Ex. 1005, 33:27–32; Ex. 1007, 1:38–41, 5:41–46, 11:31–41. In addition, a person of ordinary skill in the art would have had a reasonable expectation of success in using Hickman’s shared robot knowledgebase with Grotmol’s robot because Hickman’s shared robot knowledgebase would “not interfere” with Grotmol’s robot. Pet. 30; Ex. 1003 ¶ 166.

Patent Owner argues that Petitioner does not show sufficiently that it would have been obvious to combine the cited teachings of Grotmol and Hickman. PO Resp. 20–24; PO Sur-reply 15–19. Specifically, Patent Owner contends that Hickman teaches away from the proposed combination because “Hickman discloses storing instruction sets and images separately in separate knowledgebases,” which is “incompatible with Grotmol’s disclosure of training sets or correlations with images and instruction sets correlated and stored together.” PO Resp. 20–21 (citing Ex. 2007 ¶¶ 138–142) (emphasis omitted); *see* PO Sur-reply 17. According to Patent Owner, “as shown in Figure 3 from Hickman . . . , Hickman teaches that images are



stored in one knowledgebase 307 while instruction sets are stored separately (i.e. uncorrelated) in another knowledgebase 309.” PO Resp. 23 (citing Ex. 1005, 13:64–21:39; Ex. 2007 ¶¶ 141–142). Patent Owner also contends that Petitioner “failed to provide a reason to modify or combine the prior art to achieve the claimed invention and . . . failed to provide evidence of a reasonable expectation of success,” and instead relies on “impermissible hindsight.” PO Resp. 22–23 (citing Ex. 2007 ¶¶ 141–142); *see* PO Sur-reply 18–19.

Patent Owner’s arguments are unavailing. First, Hickman does not teach away from storing Grotmol’s training sets in Hickman’s shared robot knowledgebase. “A reference that ‘merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into’ the claimed invention does not teach away.” *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017). Hickman teaches a “shared robot knowledge base[]” that “is updated based on robot experiences so that any particular robot may benefit from prior experiences of other robots.” Ex. 1007, code (57). Patent Owner’s argument relies specifically on Hickman’s Figure 3. PO Resp. 20–21, 23–24 (citing Ex. 1005, Fig. 3). Even if Patent Owner is correct that Hickman’s Figure 3 shows images stored separately from instruction sets, Hickman’s Figure 3 is just an “*example* shared robot knowledge base.” Ex. 1007, 11:42–46 (emphasis added); *see id.* at 10:57–11:7 (“[T]he distribution of the information across the various component knowledge bases shown [in] FIG. 3 is merely one example of one embodiment.”). Patent Owner does not identify any specific portion of Hickman that criticizes, discredits, or otherwise discourages storing an image correlated with an instruction set in

the shared robot knowledgebase. *See* PO Resp. 20–24; PO Sur-reply 15–19; Ex. 2007 ¶¶ 138–142.

In fact, contrary to Patent Owner’s arguments, Hickman teaches that its shared robot knowledgebase shown can store an image correlated with an instruction set. For example, Hickman teaches that general object knowledge base 308 in Figure 3 includes “image data (IMG)” correlated with “task data (TASKS).” Ex. 1007, 15:28–34. Hickman also teaches that, in some embodiments, “the task data (TASKS) includes robot instruction code for performing tasks” and does “not require a separate task knowledge base 309.” *Id.* at 19:23–33. Thus, the shared robot knowledgebase shown in Hickman’s Figure 3 may include image data correlated with robot instruction code. *Id.*; Ex. 1010 ¶ 89.

Second, Petitioner explains specifically why a person of ordinary skill in the art would have combined the cited teachings of Grotmol and Hickman. Pet. 27–30. As discussed above, the evidence of record indicates that a person of ordinary skill in the art would have combined Grotmol and Hickman because Hickman’s shared robot knowledgebase would facilitate wider and faster sharing of Grotmol’s training sets. *Id.* at 27–29; Ex. 1003 ¶¶ 160–161, 164; Ex. 1005, 33:27–32; Ex. 1007, 1:38–41, 5:41–46, 11:31–41. And the evidence of record indicates that a person of ordinary skill in the art would have found the proposed combination to be “expected and predictable.” Pet. 30; Ex. 1003 ¶ 166.

Patent Owner also argues that Petitioner “failed to provide [a] proper obviousness analysis” because Petitioner “failed to identify the claimed features not taught by Grotmol and how/why it would have been obvious in view of Hickman to implement such features.” PO Resp. 48–49; *see id.* at

22, 24, 27. Patent Owner’s argument is unavailing. Petitioner asserts in the Petition that “[i]n the combination of Grotmol and Hickman, the training configuration learned by operation of a robot described in Grotmol would be uploaded to the server containing the ‘shared robot knowledge base’ described in Hickman.” Pet. 33 (citing Ex. 1003 ¶¶ 356–357); *see id.* at 35. Thus, Petitioner explains that Grotmol does not teach expressly the server recited in claim 25 or the shared knowledgebase recited in claim 27, and provides evidence that using Hickman’s shared robot knowledgebase would have been obvious. *Id.* at 27–29, 33; Ex. 1003 ¶¶ 160–161, 164, 356–357.

Lastly, Patent Owner argues that Petitioner’s Reply “attempts to force an entirely new mapping of Hickman’s disclosure to the claimed invention that is untimely, incorrect and impermissible.” PO Sur-reply 17–18 (emphasis omitted); *see id.* at 3. Patent Owner contends that “[f]or the first time in its Reply, Petitioner maps the tasks data disclosed by Hickman to the claimed instruction sets.” *Id.* at 18 (citing Pet. Reply 18–20).

Patent Owner’s argument is unavailing. Petitioner asserts in the Petition that “[i]n the combination of Grotmol and Hickman, the training configuration learned by operation of a robot described in Grotmol would be uploaded to the server containing the ‘shared robot knowledge base’ described in Hickman.” Pet. 33; *see id.* at 35. Patent Owner responds in the Response by arguing that Hickman teaches away from the proposed combination with Grotmol because Hickman’s shared robot knowledgebase does not store images correlated to instruction sets. PO Resp. 20–21, 23. Petitioner then points to Hickman’s discussion of task data in the Reply to show that Patent Owner’s characterization of Hickman is incorrect because the shared robot knowledgebase can store images correlated to instruction

sets. Pet. Reply 18–19. Thus, Petitioner’s reliance on Hickman’s task data in the Reply is a proper response to an argument raised by Patent Owner in the Response, not a new theory of unpatentability. *See* 37 C.F.R. § 42.23(b); *Rembrandt Diagnostics, LP v. Alere, Inc.*, 76 F.4th 1376, 1383–84 (Fed. Cir. 2023) (“[A] reply may be proper if it is responsive and simply expands on previously raised arguments.”).

### 5. *Summary*

For the foregoing reasons, Petitioner has shown by a preponderance of the evidence that claims 25 and 27 would have been obvious over Grotmol and Hickman.

#### *F. Obviousness of Claim 30 over Grotmol and Hoffman*

Petitioner argues that claim 30 would have been obvious over Grotmol and Hoffman. Pet. 37–43. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claim 30 would have been obvious over Grotmol and Hoffman. Claim 30 depends from claims 1, 4, and 29. Ex. 1001, 167:14–20. We address the limitations of claims 1 and 4 above, and we address the limitations of claim 29 below. *See* Sections II.D.2, II.D.3, II.F.2.

#### 1. *Overview of Hoffman*

Hoffman relates to “[a]utonomous and semi-autonomous robots.” Ex. 1009, 7:22–23. Hoffman describes using data received from a sensor to generate “a layout map” of a robot’s environment. *Id.* at 7:64–8:8, Fig. 6F.

#### 2. *Claim 29*

Claim 29 depends from claim 4, and recites “wherein the generating the new one or more digital pictures includes: detecting one or more objects in the first device’s surrounding or the second device’s surrounding;

generating one or more representations of the one or more objects; and generating the new one or more digital pictures that include the one or more representations of the one or more objects.” Ex. 1001, 167:5–13. Grotmol teaches a sensor for detecting an object in the first robot’s surrounding and generating a new image that includes a generated representation of the object. Pet. 40–42; Ex. 1005, 7:60–63, 8:57–9:3, 9:41–52, 10:23–34, 24:31–25:5, 38:56–65, Fig. 20A.

Patent Owner argues that Petitioner does not show sufficiently that Grotmol discloses detecting an object in the first device’s surrounding, generating a representation of the object, and generating a new picture that includes the representation of the object. PO Resp. 38–41; PO Sur-reply 23–24. Specifically, Patent Owner contends that “[t]he detected objects in claim 29 are separate entities from the new generated digital picture . . . and are detected prior to the generating of the new digital picture . . . , whereas objects in Grotmol are depicted in and are a part of the image captured by a camera and are never detected to be used to generate the image.” PO Resp. 39 (citing Ex. 2007 ¶¶ 163–166). Patent Owner also contends that Petitioner “talks about operation of a robot that may be based in part on recognized objects, not that a new digital picture is generated using detected objects and using generated representations of the detected objects.” PO Resp. 39–40 (citing Ex. 2007 ¶¶ 164–166). Patent Owner further contends that “Grotmol captures images by a camera but never detects objects in those images in order to generate representations of the detected objects in order to then generate a new digital picture based on those representations of the detected

objects.”<sup>9</sup> PO Resp. 40–41 (citing Ex. 2007 ¶¶ 165–166) (emphasis omitted); *see* PO Sur-reply 23–24.

Patent Owner’s arguments are unavailing. Grotmol teaches a “sensor component . . . characterized by an aperture/field of view . . . (e.g., an extent of the observable world that may be captured by the sensor at a given moment).” Ex. 1005, 8:60–64. Grotmol’s sensor “provide[s] information associated with objects within the field-of-view,” including “representations of one or more objects.” *Id.* at 8:64–66, 10:23–26. In other words, Grotmol’s sensor detects an object in its field of view and generates a representation of the object. *Id.* Grotmol’s sensor then generates an image that “comprise[s] representations [of] one or more objects.” *Id.* at 38:52–58. Thus, Grotmol teaches generating a new image that includes a generated representation of the object. *Id.* at 8:60–66, 10:23–26, 38:52–58; Ex. 1003 ¶¶ 327–328.

### 3. *Claim 30*

Claim 30 depends from claim 29, and recites “wherein the detecting the one or more objects in the first device’s surrounding or the second device’s surrounding includes detecting at least one or more locations of the one or more objects, and wherein the new one or more digital pictures include a top-down view of the one or more representations of the one or more objects.” Ex. 1001, 167:14–20. Grotmol teaches a sensor that detects a location of an object in the first robot’s surrounding. Pet. 42–43; Ex. 1005,

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<sup>9</sup> For claim 29, Patent Owner asserts that Petitioner’s reliance on Grotmol’s image 2010 was not “in the Petition.” PO Sur-reply 24. We disagree. Petitioner relies on Grotmol’s “images 2000 and 2010” for its arguments regarding claim 29 in the Petition. Pet. 41–42.

8:57–9:3, 7:60–64, 9:41–52, 10:23–34, 38:56–65, Fig. 20A. Hoffman teaches generating a map of a robot’s surroundings that includes a top-down view of an object representation. Pet. 43; Ex. 1009, 8:1–8, Fig. 6F. The evidence of record indicates that it would have been obvious to combine the teachings of Grotmol and Hoffman so that Grotmol’s robot generates a new image that includes Hoffman’s top-down view of an object representation. Pet. 39–40; Ex. 1003 ¶ 370.

Patent Owner argues that Petitioner does not show sufficiently that the Grotmol and Hoffman combination teaches detecting a location of an object. PO Resp. 42–43; PO Sur-reply 25. Patent Owner contends that “Grotmol’s detecting of objects makes no mention of detecting the locations of those objects at all, as Grotmol only discloses detecting objects but does not disclose detecting positions or locations of those objects.” PO Resp. 43 (citing Ex. 2007 ¶ 168) (emphasis omitted). Further, according to Patent Owner, “the portions of Grotmol cited by Petitioner only refer to the position or location of the robot, not objects.” PO Sur-reply 25 (citing Pet. Reply 27) (emphasis omitted).

Patent Owner’s arguments are unavailing. Grotmol teaches a sensor that provides “representations of one or more objects,” including “object size [and] location.” Ex. 1005, 10:23–34. Thus, Grotmol’s sensor detects the location of an object in the robot’s surrounding, not just the location of the robot. *Id.*; Ex. 1010 ¶ 105.

Patent Owner also argues that Petitioner does not show sufficiently that the Grotmol and Hoffman combination teaches generating a new image that includes a top-down view of the representations of those objects. PO Resp. 43–44; PO Sur-reply 25. Patent Owner contends that “Hoffman’s

augmented map cannot be the claimed ‘new one or more digital pictures’ because the map is not a picture generated by the picture generation process specifically defined in claim 29.” PO Resp. 43–44 (citing Ex. 2007 ¶¶ 169–170). Patent Owner also contends that “Petitioner’s claim that the map is generated using the robot’s location and representations of objects . . . is conclusory and not supported by Grotmol or Hoffman.” PO Sur-reply 25 (citing Pet. Reply 27–28).

Patent Owner’s arguments are unavailing. Patent Owner addresses Grotmol and Hickman individually, not the combination of Grotmol and Hickman. *See Keller*, 642 F.2d at 426. Specifically, as discussed above for claim 29, Grotmol teaches a sensor for detecting an object in the first robot’s surrounding and generating a new image that includes a generated representation of the object. *See* Section II.F.2. Hoffman teaches generating a top-down view of an object representation. Pet. 43; Ex. 1009, 8:1–8, Fig. 6F. Thus, in the proposed combination, Grotmol’s robot generates the new image in the same manner discussed for claim 29, but instead the new image includes a top-down view of the generated object representation. Ex. 1003 ¶ 370; Ex. 1010 ¶ 105.

#### 4. *Reason to Combine*

Petitioner asserts that a person of ordinary skill in the art would have had reason to combine the cited teachings of Grotmol and Hoffman. Pet. 37–40 (citing Ex. 1003 ¶¶ 366–371). We agree with Petitioner’s rationale. Specifically, it would have been obvious to a person of ordinary skill in the art to combine Grotmol and Hoffman so that Grotmol’s robot generates a new image that includes Hoffman’s top-down view of an object representation. *Id.* at 39–40; Ex. 1003 ¶ 370. Doing so would have been



obvious because Hoffman’s top-down view would benefit a user by providing more detailed information about the surroundings of Grotmol’s robot. Pet. 39–40; Ex. 1003 ¶¶ 366, 370. In addition, a person of ordinary skill in the art would have had a reasonable expectation of success in using Hoffman’s top-down view with Grotmol’s robot because Hoffman’s top-down view would “not interfere” with Grotmol’s robot. Pet. 40; Ex. 1003 ¶ 370.

Patent Owner argues that Petitioner does not show sufficiently that it would have been obvious to combine the cited teachings of Grotmol and Hoffman. PO Resp. 36–37; PO Sur-reply 22–23. Specifically, Patent Owner contends that “[i]t would not have been obvious to combine Grotmol with Hoffman to arrive at the claimed invention because Grotmol discloses a system for *autonomous* robot operation, whereas Hoffman is a system for *user-controlled (i.e. manual)* robot operation.” PO Resp. 36 (citing Ex. 2007 ¶¶ 159–161); *see* PO Sur-reply 22. Patent Owner also contends that “Petitioner fails to specifically explain why it would have been obvious to a POSA to modify Grotmol’s system with Hoffman’s map,” and instead relies on “impermissible hindsight.” PO Resp. 37 (citing Ex. 2007 ¶¶ 160–161); *see* PO Sur-reply 22. Finally, Patent Owner contends that “Petitioner fails to explain how the map in Hoffman would be used with the digital pictures claimed in Grotmol to arrive at the claimed invention and thus fails to show any likely results of the combination.” PO Resp. 36–37 (citing Ex. 2007 ¶¶ 160–161); *see* PO Sur-reply 22–23.

Patent Owner’s arguments are unavailing. First, Grotmol and Hoffman are directed to same field of endeavor as the ’583 patent, namely, semi-autonomous and autonomous robots. Pet. 39; Pet. Reply 24; Ex. 1001,

1:32–39; Ex. 1003 ¶ 370; Ex. 1005, code (57), 23:12–13; Ex. 1009, 11:31–36. In particular, Hoffman states that

[i]n some examples, the user 10 can select different levels of human control over the robot 200, ranging from a teleoperation mode, in which the user 10 directly controls the motors and actuators on the robot 200, to *autonomous operation*, in which the user 10 passes higher-level commands to the robot 200. In *partially autonomous operation*, the robot 200 can perform tasks, such as following a perimeter or wall, recovering from getting stuck in an opening or due to high centering on an obstruction, evading a moving object 114, or seeking light.

Ex. 1009, 11:31–40 (emphasis added). As Patent Owner points out, Hoffman’s “autonomous operation” still allows a user to provide some commands to a robot. *Id.*; PO Sur-reply 22. That is consistent with the ’583 patent and Grotmol, which also allow a user to provide some commands to a robot. *See, e.g.*, Ex. 1001, 1:37–39 (“A machine learning solution is needed for . . . devices to be *less dependent on* or fully independent from user input.”) (emphasis added); Ex. 1005, 23:12–13 (“In the override mode, the robot may execute what it has learned, unless a command is sent by the teacher.”).

Second, Petitioner explains specifically why and how a person of ordinary skill in the art would have combined the cited teachings of Grotmol and Hoffman. Pet. 39–40. As discussed above, a person of ordinary skill in the art would have had a specific reason to combine Grotmol and Hoffman because Hoffman’s top-down view would benefit a user by providing more detailed information about the surroundings of Grotmol’s robot. *Id.*; Ex. 1003 ¶¶ 366, 370; Ex. 1010 ¶ 102. And a person of ordinary skill in the art would have combined Grotmol and Hoffman so that Grotmol’s robot generates the new image in the same manner discussed for claim 29, but

instead the new image includes Hoffman’s top-down view of the object representation. Pet. 39–40; Ex. 1003 ¶ 370; Ex. 1010 ¶ 105.

5. *Summary*

For the foregoing reasons, Petitioner has shown by a preponderance of the evidence that claim 30 would have been obvious over Grotmol and Hoffman.

III. CONCLUSION<sup>10</sup>

Petitioner has shown by a preponderance of the evidence that claims 10, 11, 25, 27, and 30 of the ’583 patent are unpatentable.

In summary:

<b>Claim(s)</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Claim(s) Shown Unpatentable</b>	<b>Claim(s) Not Shown Unpatentable</b>
10, 11	103	Grotmol	10, 11	
25, 27	103	Grotmol, Hickman	25, 27	
30	103	Grotmol, Hoffman	30	
<b>Overall Outcome</b>			10, 11, 25, 27, 30	

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<sup>10</sup> Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

#### IV. ORDER

It is hereby

ORDERED that claims 10, 11, 25, 27, and 30 of the '583 patent are shown unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Patent 11,055,583 B1

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