

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner

v.

AUTONOMOUS DEVICES, INC.,
Patent Owner

Case IPR2024-00745
Patent 11,663,474

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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EXHIBIT LIST

TESLA-1001	U.S. Patent No. 11,663,474 (“the ’474 Patent”)
TESLA-1002	U.S. Patent No. 11,663,474 File History
TESLA-1003	Expert Declaration of Jason Janet, Ph.D.
TESLA-1004	First Amended Complaint, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 92 (Sept. 15, 2023)
TESLA-1005	U.S. Patent Pub. No. 2014/0089232 to Buibas et al. (“Buibas”)
TESLA-1006	U.S. Patent Pub. No. 2013/0325768 to Sinyavskiy et al. (“Sinyavskiy”)
TESLA-1007	U.S. Patent Pub. No. 2017/0024877 to Versace et al. (“Versace”)
TESLA-1008	U.S. Patent No. 9,604,359 to Grotmol et al. (“Grotmol”)
TESLA-1009	U.S. Patent No. 5,219,264 to McClure et al. (“McClure”)
TESLA-1010	U.S. Patent Pub. No. 2018/0137403 to Kaur et al. (“Kaur”)
TESLA-1011	U.S. Patent Pub. No. 2016/0167226 to Schnittman (“Schnittman”)
TESLA-1012	Scheduling Order, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 25 (March 22, 2023)
TESLA-1013	Stipulation and [Proposed] Order to Stay Pending <i>Inter Partes</i> Review, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 143 (Jan. 9, 2024)
TESLA-1014	Stay Order, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), (Jan. 10, 2024)

TESLA-1015	Original Complaint, <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 1 (Nov. 7, 2022)
TESLA-1016	Email Correspondence from Patent Owner’s Counsel Mr. John Holley re Asserted Claims of ’474 Patent (Nov. 3, 2023)
TESLA-1017	Autonomous Device’s Infringement Contention Chart for U.S. Patent No. 11,663,474 (Exhibit K), <i>Autonomous Devices LLC v. Tesla, Inc.</i> , Case No. 22:1466-MN (D. Del.), Doc. 92-1 (Sept. 15, 2023) (Public)
TESLA-1018	U.S. Patent Pub. No. 2003/0216834A1 to Allard (“Allard”)
TESLA-1019	U.S. Patent Pub. No. 2006/0181236A1 to Brogardh (“Brogardh”)
TESLA-1020	U.S. Patent Pub. No. 2013/0226345A1 to Zhao et al. (“Zhao”)
TESLA-1021	Federal Court Management Statistics—Profiles, U.S. District Courts—Combined Civil and Criminal (December 31, 2023 Reporting Period), <i>retrieved from</i> https://www.uscourts.gov/sites/default/files/fcms_na_distprofile1231.2023_0.pdf
TESLA-1022	Second Expert Declaration of Jason Janet, Ph.D.
TESLA-1023	U.S. Patent No. 9,221,396 to Zhu et al. (“Zhu”)
TESLA-1024	<i>Neural Network Design</i> , Second Edition (“Hagan”)
TESLA-1025	Declaration of June Munford
TESLA-1026	<i>Tesla, Inc. v. Autonomous Devices, Inc.</i> , IPR2023-01054, Paper 46 (PTAB December 12, 2024) – Final Written Decision on U.S. Patent No. 10,452,974
TESLA-1027	<i>Tesla, Inc. v. Autonomous Devices, Inc.</i> , IPR2023-01055, Paper 47 (PTAB December 12, 2024) – Final Written Decision on U.S. Patent No. 11,238,344

TESLA-1028	Eli Saber Deposition Transcript (April 4, 2025)
TESLA-1029	U.S. Patent Application Serial No. 13/623,820 (“Fisher”)
TESLA-1030	U.S. Patent No. 10,131,052 (“Gabardos”)
TESLA-1031	U.S. Patent No. 8,793,205 (“Fisher205”)
TESLA-1032	Eli Saber Deposition Transcript in ’583 Patent IPR, IPR2023-00172, Exhibit 1011 (June 21, 2024)
TESLA-1033	<i>Tesla, Inc. v. Autonomous Devices, Inc.</i> , IPR2023-01054, Paper 26 – Patent Owner’s Response
TESLA-1034	<i>Tesla, Inc. v. Autonomous Devices, Inc.</i> , IPR2023-01055, Paper 26 – Patent Owner’s Response
TESLA-1035	U.S. Patent Pub. No. 2017/0200078 A1 (“Bichler”)
TESLA-1036	U.S. Patent Pub. No. 2015/0363687 A1 (“Gocek”)
TESLA-1037	U.S. Patent Pub. No. 2013/0304684 A1 (“Yufik”)
TESLA-1038	U.S. Patent Pub. No. 2017/0010106 A1 (“Shashua”)

I. INTRODUCTION

Patent Owner Autonomous Devices, Inc. (“PO”) raises in its Patent Owner Response (“POR”) only limited rebuttals to the compelling obviousness challenges presented in Grounds 1A-2D of the Petition. The POR in fact contains no arguments at all with respect to most claims at issue in this IPR (i.e., claims 45-47, 51, 59-60, and 68-69) and PO no longer contends they are patentable. The only two claims addressed in the POR are dependent claims 56 and 57—i.e., two claims directed to subject matter highly similar to that of claims previously found unpatentable in IPR2023-01054 and -01055 involving parents to the ’474 Patent. *See, e.g.*, TESLA-1026 (’974 Patent, Claims 4, 11), pp. 64-73; TESLA-1027 (’344 Patent, Claims 11-12), pp. 65-86. The arguments that PO does raise on claims 56 and 57, however, are flawed and fail to refute the Petition’s showing that these claims recite merely conventional features that would have been obvious to a POSITA long before the earliest effective filing date of the ’474 Patent (November 2, 2016).

For the reasons described in the Petition and this Reply, the Board should find all Challenged Claims in this IPR unpatentable based on Grounds 1A-2D.

II. GROUND 1A: OBVIOUSNESS BASED ON BUIBAS-SINYAVSKIY

A. Buibas Renders Obvious “The One or More Inputs are Further Correlated with Another One or More Instruction Sets for Operating a Third Device” (Claims 56, 57)

Claims 56 and 57 each depend from claims 45 and 46 and identically add to the base claims a limitation requiring that “the one or more inputs are further correlated with another one or more instruction sets for operating a third device.” TESLA-1001, 177:58-178:7; TESLA-1022, ¶8. Read in the context of the base limitations from claim 45, claims 56 and 57 thus require, *inter alia*:

*A **first device** comprising:
a knowledgebase that includes **one or more inputs** for inputting at least a portion of a circumstance representation,
wherein the one or more inputs are correlated with one or more instruction sets for operating a **second device**; ... [and]
wherein the one or more inputs are further correlated with another one or more instruction sets for operating at **third device**.*

As noted in the Petition, the phrase “instruction sets for operating a second device” in the ’474 Patent includes instruction sets learned by operating the second device. Pet., 4-5, 27-29; TESLA-1001, 102:30-103:39, FIG. 38. Likewise, the phrase “instruction sets for operating a third device” includes instruction sets learned by operating the third device. *Id.*; TESLA-1022, ¶9. Taken together, claims 56-57 recite features that include a first device having a knowledgebase with one or more inputs correlated both with (i) instruction sets learned by operating a second device

and (ii) additional instruction sets learned by operating a third device—i.e., a concept that PO has referred to as a “mixed” knowledgebase in its arguments on similar claims previously found unpatentable in IPR2023-01054 and -01055. TESLA-1033, 28, 31-32, 53; TESLA-1034, 27, 32-33; TESLA-1022, ¶¶9-10.

1. Buibas Discloses a “Mixed” Knowledgebase That Combines the Knowledge and Capabilities Learned at Multiple Devices into a Single Robotic Brain

As an initial matter, Petitioner observes that PO does not directly dispute that Buibas discloses the allegedly core feature of the patents in this family, reflected in claims 56 and 57, of a “mixed” knowledgebase that produces instruction sets learned by operating multiple devices. TESLA-1022, ¶11. Like the art applied in the IPRs on the parent patents, Buibas similarly shows that this concept was well known before the earliest effective filing date of the patents at issue (e.g., the ’974, ’344, and ’474 Patents). *See* TESLA-1033, 28, 31-32, 53; TESLA-1034, 27, 32-33; TESLA-1022, ¶11. Indeed, the sharing and mixing of knowledge, such as by the “merging” of brain images that control autonomous robotic devices, are concepts described extensively in Buibas. *See, e.g.*, TESLA-1005, [0070], [0188], [0223], [0225].

Unable to contest Buibas’ disclosure of a “mixed” knowledgebase, PO shifts its focus to details of the claimed “**correlation**” of the “one or more inputs” of the knowledgebase to the “additional one or more instruction sets for operating a third

device.” But there is little, if any, evidence that the requirement for a further “**correlation**” of knowledgebase inputs to instruction sets bears any significance to the alleged invention. Apart from the benefits of a mixed knowledgebase generally, the ’474 Patent identifies no criticality or particular significance to the disputed feature of a mixed knowledgebase that correlates its **same** inputs to an additional set of instructions. The specification of the ’474 Patent in fact never once uses the claim language for correlating knowledgebase inputs with instruction sets at all. Indeed, if anything, the ’474 Patent trivializes details around the structure of the knowledgebase by leaving a POSITA to implement the functions disclosed in the ’474 Patent on any suitable model. TESLA-1001, 103: 44-55 (“The disclosed systems, devices, and methods are **independent** of the artificial intelligence model and/or technique used and **any model and/or technique can be utilized** to facilitate the functionalities described herein.”).¹ TESLA-1022, ¶12.

To be sure, PO itself relies upon the above-quoted disclosure about decoupling the disclosed functions from the structure of the knowledgebase in its Motion to Amend, and PO specifically points to this disclosure as the basis for alleged written description for inputs correlated to instruction sets for operating different devices in a neural network as recited in the substitute claims (since the

¹ All emphasis added unless otherwise indicated.

details of a neural network implementation of the claimed functions are not expressly disclosed). MTA, 9-11 (citing EX2004, 93:27-94:7); EX2001, 83, 118, 132, 140, 146, 159, 166, 200, 211. For example, and relevant to its arguments on claims 56 and 57, PO highlights generic disclosure of a feedforward neural network in the '474 Patent's priority application—shown as “Model A” in FIG. 17—and contends that the claimed correlations exist simply because “Model A show[s] input nodes/neurons correlated using downstream connections with output nodes/neurons that include/produce instruction sets for operating a device.” MTA, 9-11; EX2001, 79-80, 113, 127, 139, 141, 154, 164, 192, 203; TESLA-1022, ¶¶12-13. PO offered no further explanation of its basis for support for these features beyond a long citation of less pertinent disclosures. *Id.*

The lack of express/specific discussion in the '474 Patent or its priority applications for the same one or more inputs of a knowledgebase being correlated both with instruction sets for operating a second device and with additional instruction sets for operating a third device is notable in light of PO's repeated criticisms of the Petition and the prior art for its alleged lack of specificity with respect to details of the one or more inputs and their correlations to instruction sets. *See, e.g.,* Pet., 28 (“Petitioner cites **extreme generalities** and expects the Board to ignore the **specific language** of claim 56 ...”), 17 (“Buibas ¶[0189] and ¶[0225] discuss merging brain images **very generally** without even a mention of **additional**

another instruction set for operating **a third device**, the **same one or more inputs**, and how they are **further** correlated.”), 12. PO’s exacting review of the prior art, and its search for near-verbatim disclosure of the claimed features, is exactly the opposite approach applied by Dr. Saber in his analysis of the ’474 Patent’s priority application for alleged written description support. TESLA-1028, 79:3-81:11 (“I don’t have to find every single word everywhere and every excerpt to say that.”). Indeed, PO cites no record evidence that the claims’ recitation of the **same** one or more inputs being correlated with multiple sets of instructions is anything more than an insignificant implementation detail or obvious design choice, as the specification suggests it is. TESLA-1001, 103: 44-55 (“any model and/or technique can be utilized”); *Ex Parte Spangler*, Appeal No. 2018-003800 at 6 (PTAB Feb. 20, 2019) (citing *In re Rice*, 341 F.2d 309, 314 (CCPA 1965) (“Appellants have failed to show that the [differences in the claimed invention], as compared to [the reference], result in a difference in function or give unexpected results.”); *In re Kuhle*, 526 F.2d 553, 555 (CCPA 1975) (“Use of such a means of electrical connection in lieu of those used in the references solves no stated problem and would be an obvious matter of design choice within the skill of the art.”).); TESLA-1022, ¶13.

Regardless, Buibas fully discloses and renders obvious all aspects of claims 56 and 57 for the reasons addressed in the Petition and further described below.

2. Buibas' Merge Operations Combine Fully-Defined Brain Images, Which Involves Merging More Than Weights of Brain Images

The Petition cited Buibas' "techniques for 'merging' brain images to combine behavior modules learned on two or more robots (a *second device* and a *third device*)" in support of showing that the combination in Ground 1A renders obvious "one or more inputs" of a knowledgebase further correlated with an additional one or more instruction sets for operating a third device. Pet., 41-42. PO argues that this mapping is deficient because "a network merge" is allegedly "a phrase Buibas uses for a merge of weight vectors of the neural networks, not for merging of neural networks." POR, 14-15. Not so. PO's argument reveals an incomplete and incorrect understanding of Buibas' network merge and Buibas' brain image. TESLA-1022, ¶14.

To this point, PO narrowly focuses its argument on Buibas' description of FIG. 4, which explains that "*In some implementations*, the network lifecycle *may* comprise network *weight updates* comprising two or more sources, also referred herein to as 'merges.'" TESLA-1005, [0094], FIG. 4; *generally id.*, [0090]-[0115], FIGS. 3-5. While it is true that the discussion of FIG. 4 centers on merging network weights, Buibas never suggests that a network merge operates *only* to combine the *weights* of the parent networks as opposed to the networks themselves. TESLA-1022, ¶15. As Dr. Janet explains, a POSITA would not have read the disclosure of

FIG. 4 in isolation without considering Buibas' disclosure in its entirety, which clarifies that not only weights, but "**brain images**" that fully define the networks for each task can be the subject of a network merge, thereby form an offspring that combines the capabilities of two or more parent brain images as a whole. See, e.g., TESLA-1005, [0225] ("The user may also augment the old brain image with new functionality from a partial new brain. ... **Users may also merge brain full images** **The merging of brain images involves the combination of one brain image with another brain image.**"), [0188] ("[T]wo or more **partial brain images may be combined to form full brain images.**"), [0189] "combining brain images"; "form full brain images from partial brain images"), [0070] ("**the artificial mind and its traits** may be copied, stored, and later retrieved"). Buibas specifically explains that a brain image (or a partial brain image) fully defines a neural network **including not just weights but also the neurons, topology, and pathways of the network**. See, e.g., [0203] ("[T]he brain image serves as **a spatial mapping (in a simulated space) of the neurons and synapses** of an artificial neural network. The brain image is expressed as a sparse matrix (allows for empty space, growth, and connectivity mapping)."), [0205] ("The **brain image** is modified by training. Thus, the robotic learning process is achieved by **adding or removing neurons, and/or generating new links between neurons.**"); TESLA-1022, ¶15.

Considering that Buibas identifies “brain images” as the subject of a merge, and that brain images are comprised not only of weights but also of neurons and other information that fully defines a trained neural network, a POSITA would have understood, or at least found obvious, that a network merge in Buibas would involve a merge of the neural networks themselves—including but not limited to the weights of the networks. TESLA-1022, ¶16. This understanding is also consistent with Buibas’ description of the merge as a “network” merge and with Buibas’ explanation that a merged brain image incorporates the full “capabilities” of the parent images in the offspring. TESLA-1005, [0096] (“**combine capabilities** of two (or more) parents”), [0103] (“off-spring exhibiting **combined set of capabilities**”), [0092] (“may be used, for example, when updating one or more modules of a partitioned network, (e.g., a motor-control partition, or a signal processing partition)”). Buibas further explains that a merge can be an “interleaved” merge that splices portions of the parent networks into a single network or a “non-interleaved merge” that effectively allocates each parent network to a separate partition in the offspring brain image. TESLA-1005, [0096]-[0103], FIGS. 4-5; TESLA-1022, ¶16.

Moreover, regardless of how the particular type of merge employed, a POSITA would have understood from Buibas’ explanation that the offspring retains the full capabilities of the parent networks that the offspring incorporates sufficient aspects of the parents that allow it to perform the same functions and thus produce

the same or equivalent outputs for a given input as the parents (e.g., output instructions sets for operating a second device and additional instructions sets for operating a third device, where those outputs are part of the respective capabilities of the parents). TESLA-1022, ¶17. The incorporated aspects of the parent networks would include weights, but would also include additional aspects such as additional neurons and the like to the extent necessary for the offspring to implement the combined capabilities of the parents as described in Buibas. *Id.* This understanding is further supported by a related patent application, filed by a co-inventor of Buibas, that explains how the “*entire designs*” of networks are copied and the networks themselves are merged. TESLA-1031, 8:33-45; *see also id.*, 11:34-44, 12:41-15:6, FIGS. 3-5; TESLA-1022, ¶18; *In re Carlson*, 983 F.2d 1032, 1037-38 (Fed. Cir. 1993) (a POSITA “is charged with knowledge of all the contents of the relevant prior art” and “is presumed to know all the pertinent prior art”); *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

3. Buibas’ Merged Brain Images Correlate the Same One or More Inputs with Instruction Sets for Operating a Second Device and Additional Instruction Sets for Operating a Third Device

PO next errs in asserting that a partitioned brain image comprised of multiple merged networks would necessarily have “separate” sets of inputs that allegedly would not satisfy the requirement in claims 56 and 57 for the *same* inputs to be

correlated with instruction sets for operating a second device ***and further*** with additional instruction sets for operating a third device. POR, 20 (“partitions themselves are separate neural networks trained for different tasks[] that each includes is own separate inputs”); TESLA-1022, ¶19.

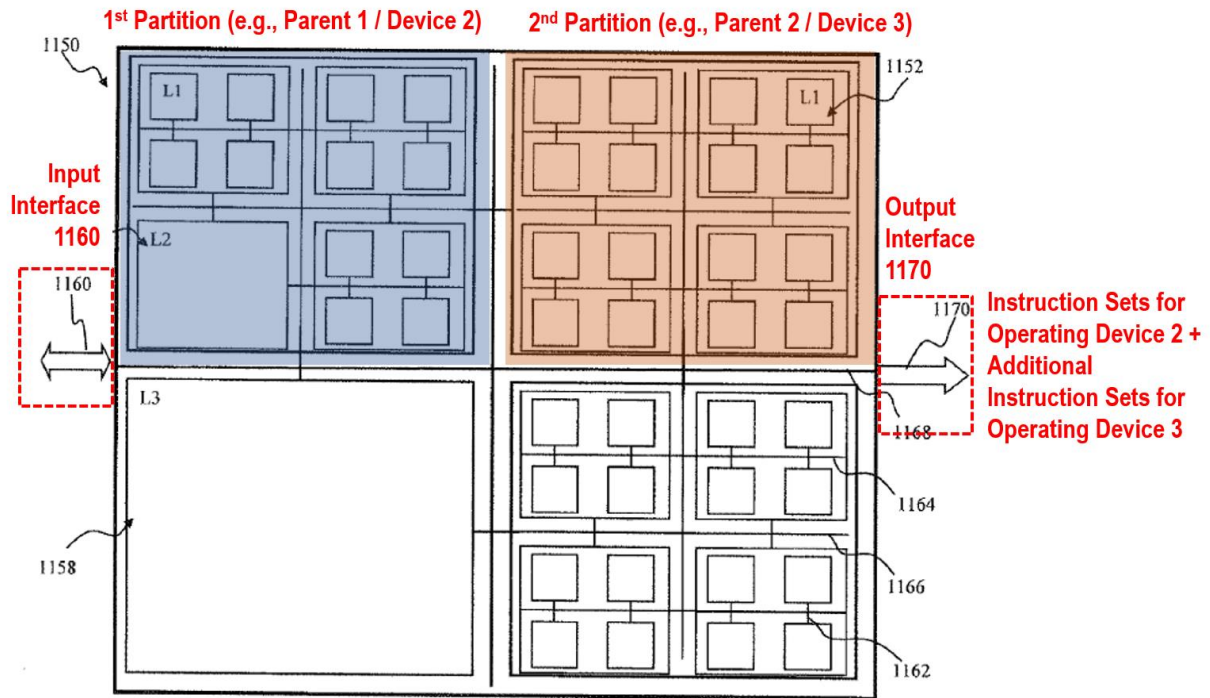
As an initial matter, the premise that Buibas’ network merge necessitates creation of a partitioned brain image comprised of multiple distinct networks is incorrect. TESLA-1022, ¶20. While Buibas does describe this option, Buibas also describes techniques for “interleaved” merges that interleave aspects of the parent networks to produce an offspring comprised of a single network that provides a combined set of capabilities from the parents. *See, e.g.*, TESLA-1005, ¶¶[0102]-[0104]. For example, Buibas explains that “two or more trash collector robotic apparatus, employed in a home or an office building, and comprising similar hardware (e.g., sensors and actuators) but trained under different conditions, and hence, comprising different sets of network weights, may utilize interleaved merges to produce an off-spring exhibiting combined set of capabilities.” TESLA-1005, [0103]. Here, because the offspring includes the “combined set of capabilities” of the parents, a POSITA would have understood that the offspring incorporates the capabilities of each of the parents and produces outputs learned by operating different parent devices, including instruction sets for operating a first parent (e.g., a second device) and additional instruction sets for operating a second parent (e.g.,

a third device), depending on whether the current input to the offspring corresponds to a circumstance learned by the first or second parent. TESLA-1022, ¶20. And because the interleaved merge results in a single offspring network, that network would have ***a single set of inputs correlated with each of its outputs*** including the instruction sets for operating the first parent (e.g., a second device) and the additional instruction sets for operating the second parent (e.g., a third device). TESLA-1022, ¶20. The POR does not even acknowledge this aspect of Buibas' disclosure.

Likewise, PO's assumption that the inputs to a ***partitioned*** brain image must be considered "separate[ly]" from each other is illogical and inconsistent with Buibas' express disclosure. TESLA-1022, ¶21. It is also inconsistent with the testimony of its own declarant, Dr. Clark, who conceded in his deposition that different subsets of the inputs to a knowledgebase could be correlated with different instruction sets. TESLA-1028, 103:13-107:2.

To this point, Buibas depicts a partitioned neuromorphic apparatus in FIG. 11D that includes just a single input interface 1160 and a single output interface 1170. The input interface 1160 is correlated by way of downstream connections to the respective outputs of each partition, which are all further communicated to the output interface 1170. The outputs of each partition would include instruction sets for operating a first parent (e.g., a second device) and additional instruction sets for operating a second parent (e.g., a third device) in the scenario of a non-interleaved

merge, and in this case, the input interface 1160 is naturally correlated with the instruction sets for operating both devices consistent with the features recited in claims 56 and 57:



TESLA-1005, FIG. 11D (annotated); *see also id.*, [0158] (“The neuromorphic apparatus 1150 may receive *input ... via the interface 1160.*”), [0159] (“The neuromorphic apparatus 1150 may provide *output* (e.g., ... *a motor command*, e.g., to zoom/pan the image array) *via the interface 1170.*”), [0157] (“*Different L2, L3, cells may also perform different aspects of operating*, for example, a robot, with one or more L2/L3 cells processing visual data from a camera, and *other L2/L3 cells*

operating motor control block for implementing lens motion what tracking an object or performing lens stabilization functions.”), [0150]-[0161], FIGS. 11A-11C.²

PO’s assumption that the inputs to each partition must be considered “separately” from each other is also unsupported by any intrinsic evidence from the claims or specification of the ’474 Patent, let alone Buibas. TESLA-1022, ¶23. The claims merely refer to “one or more inputs” of a knowledgebase (see [45.1]), and it logically follows that, if the knowledgebase includes multiple partitions, the “one or more inputs” to the knowledgebase would include the inputs to all the partitions in the knowledgebase. *Id.* Collectively, those inputs are then correlated by downstream connections to the outputs of each partition, including instruction sets

² Buibas further discloses that “two or more successive merges of the same or different types may be used to create new brain images (e.g., the same ‘father’ may be used in two successive merges once with the ‘mother’ and then again with the offspring).” TESLA-1005, [0225]. A single partition in a brain image after successive merges can thus itself include (sub-)partitions from a prior merge, and by the same logic described above, the input(s) to that partition would be correlated with the outputs of each (sub-)partition such as instructions sets for operating a second device and additional instruction sets for operating a third device. TESLA-1022, ¶22.

for operating a second device and additional instruction sets for operating a third device. *Id.* Nothing in the claims, specification, or file history of the '474 Patent requires that the inputs to different partitions in a knowledgebase be considered separately from each other. TESLA-1022, ¶23; TESLA-1028, 103:13-107:2; *see also* MTA, 9-11 (identifying Model A of FIG. 17 as alleged support); EX2001, 79-80, 113, 127, 139, 141, 154, 164, 192, 203.

4. Buibas' Merge Operations Would Result in Operable Networks that Produce Instruction Sets for Operating a Second Device and Additional Instruction Sets for Operating a Third Device

PO's additional argument that Buibas's "merge" operation precludes instruction sets from multiple devices from being combined and correlated with the same inputs in the absence of re-training is not correct. POR, 20; TESLA-1022, ¶24.

As an initial matter, PO's argument is inapplicable to non-interleaved merges in which the system produces a ***partitioned*** brain image comprised of individual parent networks integrated into ***separate portions*** of the offspring image. TESLA-1005, [0092]-[0098], [0225], FIG. 4; *supra*, §II.A.3; TESLA-1022, ¶25. For a partitioned brain image, no changes to the weights, neurons, or topology are necessary to incorporate each parent network into the offspring, as each partition simply replicates a parent network, and each partition thus provides an identical capability to its parent. TESLA-1022, ¶25. Further, the one or more inputs of the

offspring are correlated with the instructions sets produced by each partition for the reasons addressed above. *Supra*, §II.A.3; TESLA-1022, ¶25.

Even for interleaved merges that combine the parents into a single (non-partitioned) network, Buibas explains that the offspring is still operable to provide a combined set of capabilities of the parents without re-training. *See* TESLA-1005, [0103] (“utilize ***interleaved merge*** to produce an off-spring exhibiting ***combined set of capabilities***”); [0099]-[0115], [0225], FIG. 5; TESLA-1022, ¶26. PO’s suggestion that re-training would be necessary to add instruction sets is belied by Buibas’ detailed explanation of the interleaved network merge that makes it possible to combine the capabilities of previously trained parents. *Id.* PO’s vague references to conventional “backpropagation process[es]” for re-calculating/adjusting weights in a neural network does not show that such processes are always necessary, nor does PO show that the specific neural network architectures disclosed in Buibas (e.g., artificial spiking neural networks) would require re-training to add instruction sets despite Buibas’ teachings to the contrary. TESLA-1005, [0073]-[0078]; POR, 20.

In any event, PO is wrong to assert that Buibas does not disclose the option for re-training brain images. TESLA-1022, ¶27. A POSITA would have known how to perform re-training if desired, and Buibas explains that continual training can be performed to further improve performance of the brain image. TESLA-1005,

[0085] (“a trained network or collection of networks ... may be **updated**”), [0205] (“The brain image is **modified by training**”; “the weights of various modeled synapses may be **altered** through the training process”), [0211] (“The user may create a new routine, or **continue training a previous routine**”), [0220] (“The robotic device may have its brain image replaced or **rewritten by the user at various times.**”), [0124] (“the transformation may comprise **self-transformation (with or without mutation)**”); [0098]-[0099] (“Network Evolution”), FIG. 9; TESLA-1022, ¶27.

5. Merging Weight Vectors by Itself Would Still Produce a Brain Image Having One or More Inputs Correlated with the Claimed Instruction Sets for Operating Second and Third Devices

Even if one accepts *arguendo* that Buibas’ merge operation is limited to merging only network **weights** as PO contends (which is not correct—*see supra*, §II.A.2), Buibas would still render claims 56 and 57 obvious. TESLA-1022, ¶28. PO’s arguments are premised on a false dichotomy it erects between “weights” of the neural network and “instruction sets.” *See, e.g.*, POR, 14 (“Thus, merging of weight vectors results in another vector of weights, not instruction sets.”). The evidence here shows that a POSITA would not have confused weights for instruction sets, and PO’s overly simplistic analysis does not reflect how a POSITA would have analyzed the issue or Buibas’s disclosure. Although weights and instruction sets are

not the same, they are closely intertwined, particularly in the context of Buibas' neural networks that are configured to output instruction sets (e.g., motor commands) for operating a device. TESLA-1022, ¶28; TESLA-1005, [0153], [0159]. Weights define the strength of connections between successive neurons, while instruction sets are produced at the output. Weights and instruction sets are thus interrelated insofar as the output (instruction sets) produced for a given input depends on the weights of connections between the input and the output. TESLA-1005, [0062], [0073]-[0078], FIGS. 1, 10; TESLA-1022, ¶28. A POSITA therefore would have understood that Buibas does not need to specifically discuss how instruction sets are combined in a merge operation because the merging of weights itself has the effect of configuring connections between the input and output neurons that allow the offspring to produce instructions sets corresponding to the **combined** capabilities of the parents. TESLA-1005, [0103]; TESLA-1022, ¶28. Even Dr. Saber acknowledged that weights can be combined in neural networks provide a combined set of instruction sets. TESLA-1028, 149:9-155:2, 176:15-177:12; *see also id.*, 22:3-28:17, 28:19-30:8, 71:21-73:8, 101:7-111:10, 43:3-45:1, 57:5-58:13, 73:9-74:14, 79:3-81:11, 103:13-107:2, 109:2-109:16, 115:7-116:11.

Moreover, merely because a “merge” at its lowest/most granular level is carried out by combining weight vectors does not mean that the merge does not also provide a combined set of instruction sets at the output of the merged network.

TESLA-1022, ¶29. All computer functions involve low-level operations that can be clinically characterized in terms of manipulations to bits, bytes, weights, or the like, but the higher-level effect can be much more meaningful to the resulting function of the system, as it is here. TESLA-1022, ¶29. For instance, as Buibas explains, the effect of a merge operation is to provide a “combined set of capabilities” in the offspring. TESLA-1005, [0092], [0103], [0225]. Accordingly, a POSITA would have understood and found obvious from Buibas that merging weight vectors serves to combine the capabilities of the parents by weighting connections between the input and output neurons such that the output neurons would be configured to produce outputs corresponding to the capabilities of the parents, e.g., instructions sets for operating a second device and additional instruction sets for operating a third device. TESLA-1022, ¶29.

B. Buibas Renders Obvious “At Least a Portion of the One or More Instruction Sets for Operating the Third Device ... is Learned in Another Learning Process that Includes Operating the Third Device at Least Partially by Another User” (Claim 56)

PO’s further objections to the Petition’s reliance on Buibas as disclosing “at least a portion of the another one or more instruction sets for operating the third device or at least an information related to the another one or more instruction sets for operating the third device is learned in *another learning process* that includes *operating the third device at least partially by another user*” as recited in claim 56

are also unfounded. *See* POR, 27-32; TESLA-1022, ¶30. In addressing this limitation, the POR repeats many of the same arguments addressed above in §II.A of this Reply, but those arguments fail against this limitation for substantially the same reasons. TESLA-1022, ¶30.

Moreover, the Petition cited extensive disclosure from Buibas plainly showing that, in a merged brain image, the instruction sets produced by that brain image (or information related thereto) can include both (i) instruction sets for operating a second device learned in a learning process that includes operating the second device by a first user and (2) instruction sets for operating a third device learned in another (second) learning process that includes operating the third device by another (second) user. *Pet.*, 41-42. Indeed, Buibas specifically teaches that different users can independently train their respective robots to autonomously perform different tasks/behaviors. Brain images configured to perform the various tasks/behaviors learned on different devices by training routines carried out by different users operating their different robots can then be shared with other users, and users can then select and incorporate different ones of the learned tasks/behaviors into a merged brain image can be loaded on a single device. *See, e.g.*, TESLA-1005, [0171]-[0180] (describing details of the training application provided to each user), [0181]-[0193] (describing details of sharing trained brain

images through the cloud), [0194]-[0207], [0211]-[0213], [0222]-[0225], [0070], FIGS. 16-19; TESLA-1022, ¶31.

Based on Buibas’ teachings, a POSITA would have recognized, and found obvious, that when the parents to a merged brain image are networks that have been trained by different users on different devices (i.e., a second device and a third device), the instruction sets produced by the merged brain image are instruction sets for operating each of the different devices by different users. TESLA-1022, ¶32. Further, considering that the instruction sets for operating the second device and the instruction sets for operating the third device can pertain to different tasks/behaviors, and that different users can independently train the different tasks/behaviors on different devices, a POSITA would have appreciated that the training routines conducted on the two different devices constitute distinct “learning processes.” TESLA-1022, ¶32.

Notably, despite challenging the sufficiency of proof that Buibas discloses multiple learning processes, PO presents no affirmative evidence that Buibas’ separate training routines on different devices would **not** amount to separate learning processes in the context of the ’474 Patent. .” TESLA-1022, ¶33. PO does not even identify any specific factor or criterion that would need to be met to demonstrate disclosure of separate learning processes, but that is not already satisfied by Buibas. See POR, 27-32. The term “learning process” is never defined in the ’474 Patent; it

is used in passing in just a single paragraph of the '474 Patent's lengthy disclosure, with no specific explanation of its meaning. TESLA-1001, 103:10-19. In a related IPR involving similar subject matter and claims that likewise referred to multiple learning processes, PO's declarant, Dr. Saber, acknowledged that different learning processes may involve different users, different devices, and operating device(s) at different times (although not all are required). TESLA-1032, 38:18-39:2, 49:19-51:12, 52:11-55:21. All of those factors are nonetheless present in Buibas, whose platform allows different users to independently carry out different training routines on different devices at different times. These factors strongly show that the instruction sets learned on a parent third device in Buibas are learned in another learning process separate from the learning process on the second device. TESLA-1022, ¶33.

III. GROUND 2C: OBVIOUSNESS BASED ON GROTMOL-BUIBAS

A. Grotmol and Buibas Render Obvious "The One or More Inputs are Further Correlated with Another One or More Instruction Sets for Operating a Third Device" (Claims 56, 57)

Claims 56 and 57 are further rendered obvious by the Grotmol-Buibas combination as set forth in Ground 2C of the Petition. Pet., 77-82. PO attacks the Petition's reliance on Buibas in this ground based on the same flawed logic and mischaracterizations of Buibas that it earlier advanced in connection with Ground 1A (*see* POR, 37-43), but these arguments lack merit and fail to refute the Petition's

showing of obviousness in Ground 2C for substantially the same reasons addressed above in §II. TESLA-1022, ¶34.

PO's additional arguments against Grotmol are likewise deficient. TESLA-1022, ¶35. The POR contends, for instance, that in Grotmol, "all of the instruction sets for operating the first robot where they were learned are still the same instruction sets for operating the same first robot (not a third robot) when they are loaded into a second robot," and argues that "nothing in Grotmol even remotely suggests that the same inputs are further correlated with another instruction for operating a third device." POR, 39. These arguments, however, overlook pertinent teachings in Grotmol that underscore how the claimed features would have been obvious to a POSITA. TESLA-1022, ¶35.

For example, the Petition cited Grotmol's teaching that "[t]he trained controller of the robot may comprise a trained configuration configured to enable autonomous operation" and "the trained configuration may be loaded to one or more other robots in order to provide learned behaviors." TESLA-1008, 33:21-35. Grotmol discloses that the trained configuration of a controller can be updated through continuous learning, including learning in the "override" and "correct" modes. TESLA-1008, 34:59-62 ("training may comprise periods of autonomous operation and periods of learning"), 33:49-52 ("user commands ... may arrive in one or more clusters ... that may be interleaved by periods of user inactivity"), 23:9-45

(“In the override mode, the robot may execute what it has learned, unless a command is sent by the teacher. ... [T]he robot may head [sic] the teacher’s command, perform the action, and try to remember it for the next time the same situation occurs.”), 21:56-60 & Table 3 (“Learns the association”); TESLA-1022, ¶36.

A POSITA would have understood from these disclosures that Grotmol’s controller can first be trained on a third device to learn instruction sets for operating a third device; the trained configuration of the controller can be shared with and loaded on a second device where the trained configuration is updated through additional learning of instruction sets for operating the second device (e.g., in the override/correct modes); and the updated trained configuration can be shared with and loaded on a first device. TESLA-1022, ¶37. As Dr. Janet explains, this predictable situation would have been expected and obvious to a POSITA reviewing Grotmol’s disclosure, as it would allow multiple devices to gain the benefit of Grotmol’s capabilities for sharing and updating training configurations. *Id.* The predictable result would be a trained controller on the first device whose inputs are correlated both with instruction sets for operating the second device (based on training that occurred on the second device) and with instruction sets for operating the third device (based on training that occurred on the third device). *Id.*

B. Grotmol and Buibas Render Obvious “At Least a Portion of the One or More Instruction Sets for Operating the Third Device ... is Learned in Another Learning Process that Includes Operating the Third Device at Least Partially by Another User” (Claim 56)

PO’s arguments on this limitation mirror the same flawed arguments that it earlier advanced in Ground 1A. POR, 44-50. These arguments lack merit and fail to refute the Petition’s showing of obviousness for each of the reasons addressed above in §§II and III.A. TESLA-1022, ¶38.

IV. CONCLUSION

The Board should find all Challenged Claims 45-47, 51, 56-57, 59-60, and 68-69 unpatentable based on Grounds 1A-2D for each of the reasons addressed in the Petition and this Reply.

Respectfully submitted,

Dated 04/11/2025

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioners' Reply to Patent Owner's Response totals 5,563 words, which is less than the 5,600 allowed under 37 CFR § 42.24.

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The undersigned hereby certifies that on April 11, 2025, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response was provided via email to the Patent Owner by serving the email correspondence addresses of record as follows:

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