

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AXON ENTERPRISE, INC., DEDRONE HOLDINGS, INC., AND
SKYDIO, INC.
Petitioners

v.

AIRSPACE DEFENSE, INC.
Patent Owner

Case No. IPR2025-00629
Patent 10,514,711

**PETITIONERS' SUR-REPLY TO PATENT OWNER'S REPLY TO
OPPOSITION TO NON-CONTINGENT REVISED MOTION TO AMEND**

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LIST OF EXHIBITS

Ex. No.¹	Description
1001	U.S. Patent No. 10,514,711 to Bar-Nahum <i>et al.</i> , “Flight Control Using Computer Vision” (the “711 Patent”)
1002	File History for U.S. Patent No. 10,514,711
1003	Declaration of Dr. William Singhose
1004	Complaint for Patent Infringement, <i>Airspace Systems, Inc. v. Dedrone Holdings, Inc.</i> , Case No. 1-24-cv-01625 (E.D. VA), September 13, 2024
1005	U.S. Patent Application Publication No. 2017/0160751 to Pierce <i>et al.</i> , “System and Method for Controlling Drone Movement for Object Tracking Using Estimated Relative Distances and Drone Sensor Inputs” (“Pierce”) filed December 5, 2016, published June 8, 2017
1006	U.S. Provisional Application No. 62/263,510 to Pierce <i>et al.</i> , “System and Method for Controlling Drone Movement for Object Tracking Using Estimated Relative Distances and Drone Sensor Inputs” (“Pierce Provisional”), filed December 4, 2015
1007	U.S. Patent Application Publication No. 2017/0161911 to Kumar <i>et al.</i> , “System and Method for Improved Distance Estimation of Detected Objects” (“Kumar”) filed December 5, 2016, published June 8, 2017
1008	U.S. Provisional Application No. 62/263,496 to Kumar <i>et al.</i> , “System and Method for Improved Distance Estimation of Detected Objects” (“Kumar Provisional”), filed December 4, 2015
1009	U.S. Patent No. 9,769,387 to Beard <i>et al.</i> , “Action Camera System for Unmanned Aerial Vehicle” (“Beard”) filed November 5, 2014, published September 19, 2017

¹ Citations to patents are made by column and line cite; citations to patent publications are made by paragraph number; citations to Exhibit 1002 are made with reference to the Bates-stamped pagination; citations to other exhibits are made to the page number of the document itself. Citations to EX1035 and 1036 are to the underlying publication page number.

1010	U.S. Patent Application Publication No. 2017/0059692 to Laufer <i>et al.</i> , “Mitigation of Small Unmanned Aircraft Systems Threats” (“Laufer”) filed August 26, 2016, published March 2, 2017
1011	U.S. Patent No. 8,874,283 to Cavote, “Drone for Inspection of Closed Space and Method Thereof” (“Cavote”) filed December 4, 2012, published October 28, 2014
1012	Internet Archive Wayback Machine screenshot of www.lauferradarsystems.com/technology , dated August 1, 2017
1013	Laufer Wind, Eagle Take Minimization System, Contract DE-EE0007884.0000, Final Technical Report, dated March 28, 2018
1014	U.S. Patent Application Publication No. 2003/0143524 to Lerner, “Method and System for Determining the Amount, Distribution and Confirmation of Genetic Material in a Cell” (“Lerner”) filed January 31, 2002, published July 31, 2003
1015	U.S. Provisional Application No. 62/405,972 to Bar-Nahum <i>et al.</i> , “Multimodal Sensor Empowered Awareness Engine for Target Recovery and Object Path Prediction” (“’972 Provisional”), filed October 9, 2016
1016	Quadrotor Helicopter Flight Dynamics and Control: Theory and Experiment, Hoffmann <i>et al.</i> , American Institute of Aeronautics and Astronautics
1017	DJI Spreading Wings S1000+ User Manual, Version 1.4, dated January 2016
1018	Excerpts from <i>Control Theory for Humans</i> , Jagacinski and Flach, 2003
1019	Excerpts from <i>Control Systems Engineering</i> , Nise, 2004
1020	Excerpts from <i>Modern Control Systems</i> , Dorf and Bishop, 2005
1021	U.S. Patent Application Publication No. 2012/0106800 to Khan <i>et al.</i> , 3-D Model Based Method for Detecting and Classifying Vehicles in Aerial Imagery (“Khan”), filed October 28, 2010, published May 3, 2012
1022	PCT International Publication Number WO2017/123477 to Hogasten, Vehicle Based Radar Upsampling (“Hogasten”), filed January 6, 2017, published July 20, 2017, designating the U.S. and filed in English
1023	U.S. Provisional Application No. 62/277186 to Hogasten, “Vehicle Based Radar Upsampling” (“Hogasten Provisional”), filed January 11, 2016

1024	U.S. Patent Application Publication 2013/0301905 to Malecki et al., “System and Method for Determining an Orientation and Position of an Object” (“Malecki”), filed April 10, 2013, published November 14, 2013
1025	U.S. Patent Application Publication 2012/0004844 to Sahasrabudhe et al., “Formation Flying Method and System” (“Sahasrabudhe”), filed June 29, 2011, published January 5, 2012
1026	Claim Listing of Challenged Claims
1027	Siemens SIMATIC VS72X Manual, 2005
1028	<i>Command Limiting in Reconfigurable Flight Control</i> , Bodson et al., Journal of Guidance, Control, and Dynamics, Vol. 21, No. 4, July-August 1998
1029	Stipulation Email on May 29, 2025
1030	Second Declaration of Dr. William Singhose
1031	Definition of “autonomous” dated September 16, 2016
1032	Definition of “autopilot” dated September 22, 2015
1033	Transcript of Deposition of Dr. Nikolaos Papanikolopoulos in IPR2025-00629
1034	U.S. Patent No. 9,760,806 to Ning et al., “Method and System for Vision-Centric Deep-Learning-Based Road Situation Analysis” (“Ning”) filed May 11, 2016, published September 12, 2017
1035	Big/Little Deep Neural Network for Ultra Low Power Inference, Park et al., <i>2015 International Conference on Hardware/Software Codesign and System Synthesis Proceedings</i> , January 20, 2016 (“Park”)
1036	You Only Look Once: Unified, Real-Time Object Detection, Redmon et al., <i>2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR) Proceedings</i> , February 6, 2017 (“Redmon”)
1037	Declaration of Professor Hall-Ellis
1038	Transcript of Deposition of Dr. Nikolaos Papanikolopoulos for IPR2025-00530
1039	Third Declaration of Dr. William Singhose
1040	CV of Professor Hall-Ellis
1041	Transcript of Second Deposition of Dr. Nikolaos Papanikolopoulos in IPR2025-00629

I. PO FAILED TO MEET ITS WRITTEN DESCRIPTION BURDEN

SC 37: [37.e1], [37.e3], [37.e4]: The Opposition (Paper 46, “Oppo.”) demonstrated these elements are unsupported, because neural network (NN) selection for a current image depends on the NN applied to the immediately preceding image. Oppo., 1. PO states “[t]he NN selection does not depend on the NN used for the immediately preceding frame[.]” Reply (Paper 48), 1. This is false and PO’s expert agrees. EX1041, 18:15-18, 20:18-21, 17:5-20:21. Indeed, [37.e3] and [37.e4] say their selection occurs *when the second neural network was selected and applied to the immediately preceding image* and *when the first neural network was selected and applied to the immediately preceding image*, respectively. PO points to EX2019, ¶109 and ¶141, but these portions (as PO admits) merely disclose algorithms have a “cost and/or latency” associated with a frame and confidence levels are for a frame that has been processed—not for predicting an object in a subsequent frame that has not yet been processed. Reply, 1; EX2019, ¶¶109, 141. The specification does not support SC 37’s granular requirements of NN selection based on an *immediately preceding image* and the *current image*, and notably, PO’s assertion that a confidence “informs that in each frame/image, a target is detected and a corresponding confidence number is used to select the best NN” for the next frame is bare attorney argument lacking specification or expert support. Reply, 1. **[37.e3]:** The Oppo. further demonstrated *a range defined by the first threshold and a second*

threshold greater than or equal to the first threshold lacks written description. Oppo., 1-2. The intrinsic record does not disclose a range defined by two separate thresholds that can be equal, and PO does not rebut this. Reply, 1-2. Instead, PO says—without citing any support in the specification or otherwise—that “the range can be a point range, i.e., a single threshold.” *Id.*, 2. But a “single threshold” is different from, and insufficient to support, two separate thresholds that can be equal, as required by SC 37. EX1041, 20:22-22:8. PO’s other arguments do not address this concept; instead, citing EX2019 at ¶¶146-147 and 112-113, PO patches together separate thresholds (“low threshold”/“activation number”), but none of those are disclosed as two separate thresholds, that can be equal, defining a range. Reply, 2.

[37.e4]: PO argues switching between groups when confidence is higher than an activation number and a “high” confidence supports [37.e4]. Reply, 2. But as discussed for [37.e3], the specification does not disclose an “activation number” forms a *second threshold* defining a *range* as claimed, and just because a confidence is “high” does not support it being greater than the *second threshold* of the *range*. Oppo., 1-2. **SC 24:** PO argues SC 24 does not require “two separate sequential steps” and instead recites “two different kinds of classifications.” Reply, 2-3; EX1041, 22:9-26:15, 27:16-30:9. But SC 24 recites model type identification ***based on the classification*** and SC 21 provides antecedent basis, reciting to *identify a classification*. The SC 21 classification occurs first, and SC 24 identifies model type

based on SC 21's classification, but this is unsupported. *Id.* EX2019 at ¶¶94 discloses a lone classification, and combining with ¶50 impermissibly requires obviousness. **SC25:** The distance and speed values referred to by PO relate to desired speed and not speed adjustment, let alone a *second* SAF based on distance (EX2019, ¶¶90, 97); no SAF "defined" by such value exists in ¶97, and PO does not explain how mapping distance to speed provides the *second* SAF. Reply, 3. SAFs "modified and redefined at different times" and provided at different times is unsupported and erroneous. *Id.* SC 25 requires *flight control operation* performance includes determining first and second SAFs. PO leaves unexplained how these factors provided at different times would allow such a *flight control operation*. EX2019, ¶¶91 and ¶97, do not disclose determining multiple SAFs for a flight control operation.

II. SCS 21-37 ARE NOT ENABLED

The SCs are not enabled as they require undue experimentation. *Oppo.*, 2-9. PO's response is a hodge-podge of misdirection that fails to meaningfully address the *Oppo.* Reply, 3-7. PO defines a *speed adjustment factor* (SAF) but provides no explanation on how the specification teaches to *determin[e]* a SAF, which the SCs require. *Id.* For *robustness*, PO says it "**can be** determined in terms of failure rate or frequency," but the specification does not teach this and PO's expert admitted robustness can be defined by several different metrics, cutting against any argument that the specification provides sufficient guidance to determine the relative *first* and

second robustness[es] required by SCs 36 and 37. *Id.* (emphasis added); EX1041, 37:15-38:11, 40:2-45:2. *[C]ompute cost* and *refresh rate* are even worse, as PO appears to rely on the specification's bare disclosure about how a "high cost" algorithm is "high robustness/low refresh rate" and a "low cost" algorithm is "low robustness/high refresh rate." Reply, 4. A POSITA reading the specification would never know if an algorithm has a "low" or "high" compute cost (or robustness, or refresh rate), as the specification provides no objective boundaries or guidance on what is considered low, high, or even "medium." *Id.*; EX2019, ¶142-152; *Oppo.*, 5-9. The specification does not teach how to determine the *compute cost*, *robustness*, or *refresh rate* of any algorithms, any grouping metrics, or what the high/low/medium labels mean. *Id.* **Speed Adjustment Factor (SCs 21, 36, 37):**

[Factors 1-3]: Petitioners demonstrated lack of enablement based on factors 1-3, and PO's response does nothing to rebut this. *Oppo.*, 2-4. PO says factors 2 and 3 are "favorable," because *speed adjustment factor* "can be adjusted using a scaler," and equations 7 and 8 would have been "readily recognized as sigmoid functions" and "describe how 'speedfactors can be computed.'" Reply, 5. This argument rings hollow, and PO quotes language that does not even exist. *Id.*; EX2019, ¶99. Adjusting a *speed adjustment factor* ("SAF") with a scaler does not explain how a SAF is determined in the first place. *Oppo.*, 3. And PO's argument is unsupported; PO only cites to EX2019 at ¶99 and Fig. 10, but this says nothing about how to select

the values needed to compute a *speed adjustment factor* and does not explain how these equations would be recognized as sigmoids. The specification **lacks any guidance or examples** on what the constants (a, b, c) of these equations are or how they would have been selected. *Id.* Indeed, PO admits “[t]he choice of a curve/equation constants would depend on the attributes (e.g., size, weight, top-speed) of a UAV using them.” Reply, 5. But the specification provides **no guidance or examples on how** curves or constants are selected to account for these attributes. *See, e.g.*, EX2019, ¶¶97-99, 105-106, Figs. 9-10. Equations 7 and 8 do not describe how *speed adjustment factors* are determined, because their constants are undefined by the specification—all we know is that they “may be the same value or they may be different values” and “may differ” between equations 7 and 8. EX2019, ¶106. That is not guidance but an unknown choice. Confusingly, PO’s expert further says the constants may depend on “mass,” “distribution of the mass,” and the “kinematic and dynamic model of the drone,” are “drone specific,” and further that “[t]here is a whole set of things associated with the drone mechanics and the dynamical and kinematical models that may tell you the proper selection” of constants. EX1041, 36:15-37:14. But again, how would the constants be selected to account for such parameters? PO and the specification leave this question unanswered. Finally, PO admits that “[s]pecific curves and equation constant values are not provided” in the specification yet says “they would not help a POSITA.” Reply, 5. This is wrong. The

missing specific example curves and constants *would* help guide a POSITA if they explained (or even provided a single example of) how the constants were chosen in relation to the “attributes (e.g., size, weight, top-speed) of a UAV using them.”

Reply, 5. In sum, the specification is not enabling as it lacks both (1) example constants or curves demonstrating **how** they are chosen in relation to PO’s identified attributes, as well as (2) any guidance on **how** the curves and constants would be selected so they account for these attributes, as discussed above. *Harris Corp. v. IXYS Corp.*, 114 F.3d 1149, 1156 (Fed. Cir. 1997) (specification failing to disclose “how” not enabling); *Nat’l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1198 (Fed. Cir. 1999). This deficiency is fatal—far from “favorable”—and would additionally mean (regarding factor 1) an **enormous amount of experimentation** is required to determine these values and, in turn, determine a *speed adjustment factor*. PO’s statement that experimentation is “not high” and “routine” due to “conventional mechanics of UAV flight” does not address any of the deficiencies noted above or in the Oppo. with respect to experimentation and is thus unresponsive. Reply, 6; Oppo., 4. **Factors 4-8**: PO also fails to rebut Petitioners’ showing that Factors 4-8 demonstrate a lack of enablement. Oppo., 4-5. For factor 4, PO admits **nature of the invention is “complex,”** favoring Petitioners. Reply, 6 (emphasis added). PO’s statement that “SAFs is [sic] related to conventional mechanics of UAV flight” is unsupported, irrelevant, and does not

address the Oppo. that showed invention nature requires more specificity in the specification because improperly determined SAFs could be disastrous, causing an aircraft to overshoot a target, oscillate, or crash. *Id.*; Oppo., 4. For factors 5 and 7, PO acknowledges the prior art “teaches the use of SAFs” (Reply, 6), but this does not address how the specification lacks relevant guidance on determining an SAF or how SAF behavior can depend on various variables or UAV attributes, which PO itself admits. Oppo., 4-5; Reply, 5 (choice of constants depends on “attributes” of “UAV using them”). For factor 6, PO asserts without support that “‘relative skill of those in the art’ is high” but does not explain why and does not address Petitioners’ reasoning that even under PO’s elevated POSITA definition the specification’s failures are not cured. Reply, 7; Oppo., 5. For factor 8, PO generically says claim breadth is “narrow” and irrelevantly points to “ML-NNs” rather than anything regarding an SAF. Reply, 7. PO again does not address Petitioner’s argument, rendering it unrebutted. Oppo., 5. **Robustness, Compute Cost, and Refresh Rate (SC 36, SC 37): [Factors 1-3]:** PO also does not rebut Petitioners’ showing that factors 1-3 show a lack of enablement for these terms. Oppo., 5-8. For factors 2 and 3, PO says “representative NNs associated with high/low robustness, high/low cost, and high/low refresh rates, as well as specific image sizes [] and scenarios for speed adjustment,” the specification stating “high robustness equates to high cost and low refresh rate,” “knowledge of only the cost or refresh rate enables NN selection” is

supportive. Reply, 5. This is false. None of this provides guidance or direction with respect to the claims, because the specification lacks any objective measurement or metric on how to determine *robustness*, *compute cost*, or *refresh rate* for the claimed NNs, which are not limited to those NNs in the specification, and compare them—i.e. how to know a *first neural network* has a *first robustness*, *compute cost*, or *refresh rate* that is greater than a *second robustness*, *compute cost*, or *refresh rate* of a *second neural network* as claimed by SC 36 or SC 37. Section II, *supra*; Oppo., 5-8. **[Factors 4-8]:** PO also fails to rebut Petitioners’ showing that Factors 4-8 demonstrate a lack of enablement. Oppo., 8. For factor 4, PO again admits **nature of the invention is “complex,”** favoring Petitioners, and its unsupported statement that examples and “guidance about relative NN parameters mitigates the need for experimentation” is undercut by the discussion above for factors 1-3 and the opposition. Reply, 6 (emphasis added); Oppo., 5-8. PO’s arguments for factors 5-8 fail for at least the same reasons discussed above for the SAF and further do not address the Oppo. and are thus irrelevant. *Id.*; *supra*, Section II (SAF). **Thresholds (SC 37):** SC 37 is not enabled as there is no guidance or examples of a *first threshold* and *second threshold*, defining a *range*, set equal. Oppo. 8-9; *see also id.*, 1-2. PO does not confront this argument; instead, PO makes irrelevant and unsupported arguments regarding thermostats, says confidence levels “inform threshold selection,” and otherwise relies on analysis of other terms. Reply, 5-7; Oppo., 1-2,

8-9; RMTA, 24. Petitioners' enablement argument is unrebutted.

III. SCS 21-37 ARE INDEFINITE

SC 21: [21.d]; SC 36: [36.c], [36.d]; SC 37: [37.d], [37.e2]: Regarding *speed adjustment factor*, PO argues “[t]he meaning of SAF, a vector element value used to adjust speed, would have been clear to a POSITA.” Reply, 7. This does not address Petitioner’s argument; the Oppo. showed how it is unclear what this term means, including how a SAF is determined as claimed, and the specification is not helpful. Oppo., 9 (citing Section II.A). A POSITA thus would not have known the boundaries of the term as used in the SCs, rendering the SCs indefinite. *Id.* Regarding *robustness, compute cost, and refresh rate*, PO does not explain the terms’ boundaries or how these terms are determined or measured, which precludes any way of knowing their claimed comparative relationship in which some are “greater” or “less” than others. Oppo. 9; Reply, 7. PO’s expert acknowledged this, noting there are several different ways in which *robustness, compute cost, and refresh rate* may be measured. EX1041, 37:15-45:2, 49:13-51:15; EX2036, ¶133. PO’s conclusion that a “POSITA would have known how to measure” these parameters is wrong. Reply, 7-8. Pointing to EX2019 at ¶142 and ¶¶145-150, PO argues that because cost can be “estimated based on visual features” and is “directly proportional to robustness and inversely to refresh rate,” a POSITA would have been informed of the relative *robustness, compute cost, and refresh rate* values. Reply, 7. This

“proportional” argument appears to stem from the specification disclosing “high cost,” “medium cost,” and “low cost” algorithms that each have an associated robustness and refresh rate that is high, medium, or low. *Id.*; EX2019, ¶¶142, 145-150. But even if cost were “estimated” and is proportional, the specification does not say how such a cost is classified as being a high, medium, or low. *Id.* The specification provides no guideposts or boundaries, and there would thus be no way to know whether the algorithm’s robustness and refresh rate is high, medium, or low. *Id.* PO’s argument about grouped NNs and how they are “related” is contradicted by its expert who admits different algorithm versions in a single group (e.g., “tiny YOLO” v1, v2) can have differing compute costs. EX1041, 49:10-12, 51:11-15, 53:4-6, 54:19-21; EX2045, 8 (Table 7). SC 37: [37.e1], [37.e2], [37.e3], [37.e4]: PO’s argument changes the meaning of *confidence level for a detection of the target in the current image*. Reply, 8. PO says this now means a “confidence level obtained from the detection in the immediately preceding image [that] is used to select an NN for application to the current image.” *Id.* But the claim says nothing about this, and the specification does not either. Section I, *supra*. By its own terms, the claim relates to detection *in the current image* but if no NN has yet been applied to the current image, a confidence level for such detection cannot exist, rendering the claim indefinite. Oppo., 9-10. SC 37 is also indefinite because “*immediately preceding image*” is unclear; PO does not address the Oppo.’s argument here. *Id.*; Reply, 8-9.

IV. SCS 21-36 ARE OBVIOUS

Pierce: “[D]rone system 600 may be drone 102 previously described with reference to FIG. 1.” EX1005, ¶¶0027, 0042, 0044-0046, Figs. 1, 6. “Drone system 600” may include “**object tracking module 615,**” and several other on-drone components (camera capturing images in “surrounding area of drone 102,” GPS, velocity detector, laser tracking module). Object tracking module 615 is thus on-board Pierce’s drone. *Id.*; Oppo., 11-25. PO’s reference to “separate components” is for “other embodiments” and irrelevant. Reply, 9. **The Combinations Teach All Limitations:** The combinations (“combos.”) rely on Pierce’s teachings of a drone having an on-board object tracking module implementing NNs for object detection and tracking. Oppo., 11-12, 17-18, 21-22, 24-25. For GNDs 23-27, the predictable results would have been Beard’s UAV performing on-board object identification and tracking using NNs. *Id.*, 11-12, 17-18. PO’s “three-step reconfiguration” and “inoperable” arguments ignore the combos. and Pierce’s clear on-board disclosure discussed above. Reply, 9-10; Section IV, *supra*; Oppo, 11-12. And the claims and specification contradict PO. SCs 21 and 36 recite a non-GPU processor with no “three-step reconfiguration.” Reply, 10. PO says a DSP is insufficient to implement a NN, but its own specification discloses using a DSP (without reconfiguration). EX2019, ¶¶134-135, 159 (DSPs perform image processing). A POSITA thus would have made the combos. Oppo., 11-12, 17-18, 21-22, 24-25. GNDs 28-35 utilize

Pierce as the primary reference, meaning PO's argument is irrelevant for those GNDs. Oppo., 21-25. PO's arguments regarding the BLPKK (GND 23) and PKKB (GND 28) combos. are also erroneous as they misstate them, rely on bodily incorporation, and are unsupported attorney argument. Reply, 10-11. The combos. involve Khan's teachings of classification by model type involving "shape and appearance features" and Kumar's teachings to use bounding boxes, and the Oppo. demonstrated how the combos. meet the SCs. Pet. (Paper 1), 36-41; Oppo., 11-14. Finally, for SC 36, PO asserts "the cost of YOLO is less than LSTM's" and cites to 70 pages of its expert declaration as support. Reply, 11 (citing EX2036, §§ VIII.[C-F].1). This is improper incorporation by reference. 37 C.F.R. § 42.24(a); *3M Company v. Evergreen Adhesives, Inc.*, 860 Fed. Appx. 724, 725-28 (Fed. Cir. 2021). Regardless, PO never shows how the YOLO has a lower cost, and it does not as the YOLO and LSTM are separate NNs in which the YOLO's cost is higher, where the LSTM performs *incremental prediction* as claimed as it determines tracking parameters that predicts and tracks an object's location in an image frame over time. Oppo., 17-21, 24-25; EX1034, 4:55-5:3 (referring to separate RNN LSTM), 5:46-54, 6:44-53, 8:41-54, Figs. 2-3 (showing separate LSTMs). PO rehashes prior arguments to assert the combos. do not meet SCs. Reply, 11-12. PO's bare attorney argument is wrong, and as discussed above and in the Oppo., the challenged claims are unpatentable. *Id.*; *Supra*, Section IV; Oppo., 11-25.

Respectfully submitted,

BAKER BOTTS L.L.P.

A handwritten signature in black ink, appearing to read "Chad C. Walters", written in a cursive style.

Chad C. Walters (Reg. No. 48,022)
Lead Counsel for Petitioners

Date: July 13, 2026

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I certify that on this 13th day of July, 2026,
**PETITIONERS' SUR-REPLY TO PATENT OWNER'S REPLY TO
OPPOSITION TO NON-CONTINGENT REVISED MOTION TO AMEND**
and **EX1041** were served by email on the following counsel for Patent Owner:

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Respectfully submitted,

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