

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner

v.

Intellectual Ventures II LLC.,
Patent Owner

IPR2025-00342
U.S. Patent No. 7,336,805

**Declaration of Dr. Jeffrey J. Rodriguez Under 37 C.F.R. § 1.68
In Support of Petitioner's Reply**

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I, Jeffrey J. Rodriguez, do hereby declare as follows:

I. INTRODUCTION

1. I have been retained by counsel for Tesla, Inc. ("Tesla") as an independent expert witness for the above-captioned Petition for *Inter Partes* Review ("IPR") of U.S. Patent No. 7,336,805 ("the '805 Patent"). I am being compensated at my usual and customary rate for the time I spend in connection with this IPR. My compensation is not affected by the outcome of this IPR.

2. I have been asked to provide my opinions addressing arguments presented in Patent Owner's Response (Paper 16, the "POR") in this IPR. I understand that this Declaration is being filed concurrently with Petitioner's Reply to the POR.

3. In preparing this Declaration, I have considered all materials listed in my prior declaration (Ex.1003). I have also considered the following materials:

- The '805 Patent, (Ex.1001);
- The file history of the '805 Patent (Ex.1002);
- "Visual Perception of Obstacles and Vehicles for Platooning,"
Broggi et al. ("Broggi") (Ex.1005);
- "Object Recognition Using Alignment," Daniel Huttenlocher et al.
("Huttenlocher") (Ex.1006);
- Algorithms in C, Robert Sedgewick, 1990 (Ex.2006);

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- Deposition Transcript of Aditi Majumder, IPR2025-00342
(January 21, 2026) (Ex.1073); and
- any other document cited below.

4. In forming the opinions expressed in this Declaration, I relied upon my education and experience in the relevant field of art.

5. In forming the opinions expressed in this Declaration, I have also considered:

- a) the documents listed above,
- b) any additional documents and references cited in the analysis below,
- c) the relevant legal standards, including the standard for obviousness, and
- d) my knowledge and experience based upon my work in this area as described below.

II. BACKGROUND AND QUALIFICATIONS

6. My qualifications and professional experience are provided in my curriculum vitae, a copy of which can be found as Exhibit 1004. An additional summary of my relevant qualifications and professional experience is included in my previous Declaration (Ex.1003) and is hereby incorporated by reference.

III. UNDERSTANDING OF PATENT LAW

7. I am not an attorney. For the purposes of this declaration, I have been informed about certain aspects of the law that are relevant to my opinions. My understanding of the law was provided to me by Petitioner's attorneys.

8. I understand that prior art to the '805 Patent includes patents and printed publications in the relevant art that predate the priority date of the '805 Patent.

9. I understand that a claim is unpatentable if it would have been obvious from the perspective of a person of ordinary skill in the art ("POSITA") at the time the claimed invention was made. I understand that for purposes of my analysis, I assume that the priority date is the same as the time the claimed invention was made. I understand that a claim could have been obvious from a single prior art reference or from a combination of two or more prior art references.

10. I understand that an obviousness analysis requires an understanding of the scope and content of the prior art, any differences between the claimed invention and the prior art, and the level of ordinary skill in evaluating the pertinent art.

11. I further understand that a claim would have been obvious if it unites old elements with no change to their respective functions, or alters prior art by mere substitution of one element for another known in the field and that combination yields predictable results. Also, I understand that obviousness does not require physical combination/bodily incorporation, but rather consideration of what the

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combined teachings would have suggested to persons of ordinary skill in the art at the time of the claimed invention. I understand that the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.

12. As mentioned above, I understand that a claim would have been obvious if it unites old elements with no change to their respective functions, or alters prior art by mere substitution of one element for another known in the field and that combination yields predictable results. While it may be helpful to identify a reason for this combination, I understand that there is no rigid requirement of finding an express teaching, suggestion, or motivation to combine within the references. When a product is available, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a POSITA can implement a predictable variation, obviousness likely bars its patentability. For the same reason, if a technique has been used to improve one device and a POSITA would recognize that it would improve similar devices in the same way, using the technique would have been obvious. I understand that a claim would have been obvious if common sense directs one to combine multiple prior art references or add missing features to reproduce the claimed invention recited in the claims.

13. I further understand that certain factors may support or rebut the obviousness of a claim. I understand that such secondary considerations include,

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among other things, commercial success of the patented invention, skepticism of those having ordinary skill in the art at the time of claimed invention, unexpected results of the claimed invention, any long-felt but unsolved need in the art that was satisfied by the claimed invention, the failure of others to make the claimed invention, praise of the claimed invention by those having ordinary skill in the art, and copying of the claimed invention by others in the field. I understand that there must be a nexus—a connection—between any such secondary considerations and the claimed invention. I also understand that contemporaneous and independent invention by others is a secondary consideration tending to show obviousness.

14. I am not aware of any allegations by the named inventors of the '805 Patent or any assignee of the '805 Patent that any secondary considerations tend to rebut the obviousness of the Challenged Claims of the '805 Patent.

15. I understand that in considering obviousness, it is important not to determine obviousness using the benefit of hindsight derived from the patent being considered.

16. I understand that other challenges to the validity of a patent, including patent ineligibility, enablement, written description, and indefiniteness, cannot be raised in *inter partes* review proceedings before the Board to challenge the validity of the '805 Patent. Accordingly, I did not consider those other challenges.

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17. I understand that Petitioner has the burden of proving unpatentability by a preponderance of evidence, which means that the claims are more likely than not unpatentable.

18. I understand that the claims are to be construed according to the same claim construction standard that district courts use (i.e., the so-called *Phillips* standard) wherein claim terms are given their ordinary and customary meaning from the perspective of a person of ordinary skill in the art at the time of the claimed invention.

19. The analysis in this declaration is in accordance with the above-stated legal principles.

IV. LEVEL OF ORDINARY SKILL IN THE PERTINENT ART

20. I have performed the analysis below through the lens of a person of ordinary skill in the art (“POSITA”) in the field of the ’805 patent, as of its claimed priority date (June 16, 2004), as defined in paragraphs 12-14 of my previous Declaration (Ex.1003), which are hereby incorporated by reference.

V. CLAIM CONSTRUCTION

21. I have been informed that that the phrase “ordinary and customary meaning” in the so-called *Phillips* standard is often referred to as the “plain and ordinary meaning.” I will use the phrase “plain and ordinary meaning” below. In order to construe the Challenged Claims of the ’805 Patent, I have reviewed the

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entirety of the '805 Patent along with portions of the prosecution history of the '805 Patent. Consistent with the '805 Patent disclosure, I have interpreted the terms in the Challenged Claims according to their plain and ordinary meaning as understood by a POSITA, and considered any explicit definitions provided by the specification of the '805 Patent, where applicable.

A. “*performing an additional acceptance analysis*”

22. It is my opinion that there is no need to expressly construe the claim term, “*performing an additional acceptance analysis*,” because it is unnecessary to resolve whether the Challenged Claims are unpatentable. As discussed in my previous Declaration in paragraphs 118-126, the prior art teaches “*performing an additional acceptance analysis*” under the plain and ordinary meaning. Further, the prior art teaches “*performing an additional acceptance analysis*” even under Patent Owner's proposed construction, as shown in Section VI.A below. It is my opinion that the claims are unpatentable under either construction.

23. Given Patent Owner's proposed construction of “*performing an additional acceptance analysis*,” I now address the construction of this claim term. Patent Owner asserts that “*performing an additional acceptance analysis*” should be understood “to mean a separate, subsequent analysis step that operates only on the set of objects previously found plausible by the matching algorithm and evaluates those objects against image-formation constraints determined by the imaging

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sensor's properties relative to the scene; only objects that pass this analysis are designated 'accepted objects' and stored for trajectory computation." POR, 14. Patent Owner's proposed construction improperly imports multiple limitations that are not recited or required, including that the "*additional acceptance analysis*" "operates only on the set of objects previously found plausible by the matching algorithm" and is a "subsequent analysis step."

24. First, the explicit claim language contradicts Patent Owner's proposed construction of "*performing an additional acceptance analysis*." More specifically, the claim language contradicts Patent Owner's assertion that the "*additional acceptance analysis*" operates only on the set of objects previously found plausible by the matching algorithm. Claim 1 recites that the "*the additional acceptance analysis including analyzing a shape of the image formation of each object in the image data*." Ex.1001, 8:16-18. There is no reference to "*plausible objects*" in the context of the "*additional acceptance analysis*" of [1.4.3]. Accordingly, "*plausible objects*" should not be improperly imported into the claim limitation.

25. The other analysis steps of claim 1 show the inventor knew how to explicitly refer to the objects identified in a different analysis step when that was the intended scope of claim 1. For example, [1.4.1] recites "*analyzing the plurality of edge segments ... to identify **one or more potential geometric objects***," and [1.4.2] recites "*analyzing the **one or more potential geometric objects** for plausibility using*

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a matching algorithm so as to identify one or more plausible objects.” In this manner, the claim explicitly requires “analyzing **the one or more potential geometric objects**” identified by analyzing a plurality of edge segments. However, for the “*additional acceptance analysis*” in [1.4.3], the claim refers to “**each object** in the image data,” not the “one or more plausible objects” or even “the one or more potential geometric objects.” Accordingly, the explicit claim language contradicts Patent Owner’s proposed construction that attempts to limit the “*additional acceptance analysis*” to operating only on the one or more plausible objects identified by the matching algorithm.

26. Further, the explicit claim language also shows the “*additional acceptance analysis*” is not limited to “operat[ing] **only** on the set of objects previously found plausible by the matching algorithm.” To the contrary, claim 1 of the ’805 patent uses the transitional phrase “*the method comprising*” and then limitation [1.4.3] recites “... *the additional acceptance analysis including analyzing a shape of the image formation of each object in the image data based on knowledge of at least one imaging property of the imaging sensor relative to the surrounding field*” without any further limits. This “comprising” and “including” language is open-ended (i.e., nonexclusive) and does not limit the “*additional acceptance analysis*” in the manner alleged by Patent Owner. And there is no definition or other

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disclaimer in the '805 patent or its file history supporting the limitations that Patent Owner is attempting to import.

27. For at least these reasons, the explicit claim language contradicts Patent Owner's proposed construction of "*performing an additional acceptance analysis*."

28. **Second**, the specification and prosecution history of the '805 patent contradict Patent Owner's proposed construction of "*performing an additional acceptance analysis*." Patent Owner's proposed construction is based on improperly limiting the claims to a specific embodiment described in the specification. POR, 9-14. To support the argument that the "*additional acceptance analysis*" is limited to operating on plausible objects, Patent Owner points to a portion of the Summary of Invention that—contrary to the claim language that refers to "each object"—explicitly describes that "[t]hese **plausible objects** undergo an additional acceptance analysis." POR, 10; Ex.1001, 2:43-44. This is not the only embodiment described by the '805 patent. And Patent Owner has not identified any indication of manifest exclusion or restriction in the specification or prosecution history that would limit the "*additional acceptance analysis*" to operating only on plausible objects. In fact, the specification of the '805 patent contradicts Patent Owner's position by describing an embodiment where the additional acceptance analysis is performed on potential geometric objects. For example, the '805 patent explicitly describes that "**geometric objects** pieced together by the tree traversal algorithm, in connection

with the **rules derived from the geometric shape of the destination, undergo an additional acceptance analysis.**" Ex.1001, 5:19-22. Looking to claim 1, the geometric objects described in the specification as being associated with a geometrical form or shape of a destination are referred to in the claim language as "potential geometric objects," which are different from "plausible objects." Ex.1001, 8:7-14 ("analyzing the plurality of edge segments for the presence of **a geometric object associated with a geometrical form that may at least partially describe a potential destination so as to identify one or more potential geometric objects;** analyzing the one or more potential geometric objects for plausibility using a matching algorithm so as to identify **one or more plausible objects;**"). Patent Owner has not identified any words or expressions that exclude, restrict, or otherwise would limit the "*additional acceptance analysis*" of claim 1 to operating only on "plausible objects" and not on "potential geometric objects" as also disclosed by the '805 patent.

29. There is also no specific timing requirement for the "*additional acceptance analysis*" in claim 1. The explicit claim language reciting

performing an additional acceptance analysis so as to identify at least one accepted object, the additional acceptance analysis including analyzing a shape of the image formation of each object in the image data based on knowledge of at least one imaging property of the imaging sensor relative to the surrounding field

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does not include a timing requirement. Patent Owner asserts that the use of the adverbs “then” and “subsequently” **in the Summary of Invention** and the term “additional” require the “*additional acceptance analysis*” **in claim 1** to be performed subsequent to “analyzing the one or more potential geometric objects for plausibility using a matching algorithm so as to identify one or more plausible objects.” POR, 10-11. However, unlike the Summary of Invention, claim 1 does not include “then” or “subsequently.” Also, the claim does not recite any “acceptance analysis” besides the “additional acceptance analysis.” Accordingly, “additional” as used in the claim modifies “acceptance analysis” without requiring it to be subsequent to any other analysis.

30. Further, the prosecution history does not support Patent Owner's construction. Patent Owner asserts that “the Examiner credited the '805 Patent's additional acceptance analysis as a point of patentable distinction, which presupposes that the claimed acceptance analysis operates after candidate identification and **after** plausibility matching, not as a substitute for or part of those earlier steps.” POR, 13. However, looking at the actual reasons for allowance (shown below), it is clear the examiner did not characterize the acceptance analysis as occurring **after** plausibility matching. The examiner was simply reciting the claim language not taught by the prior art of record, which did not include any of the references relied upon in my analysis.

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Allowable Subject Matter

Reasons of Allowance:

1. Claims 1-19 are allowed.

The following is an examiner's statement of reasons of allowance:

Both the instant invention and the closest prior art Ninomiya et al., U.S. Patent No. 5,220,508 are directed to vehicle guidance using image analysis and image processing which further includes extracting from the acquired image data positional parameters of at least one potential destination relative to the motor vehicle. However, in the instant invention the extracting of the parameters further includes edge detection and segmentation on the image data along with performing an additional acceptance analysis so as to identify at least one accepted object, the additional acceptance analysis including analyzing a shape of the image formation of each object in the image data based on the knowledge of at least one imaging property of the imaging sensor relative to the surrounding field and storing at least one accepted object that corresponds to a most proximate destination together with corresponding relative positional data in an object list in combination with other limitations in claims 1 and 13, which is not taught by the prior art of record.

Therefore claims 1 and 13 are allowed. All other claims depending on claims 1 and 13 are allowable at least by dependency on claims 1 and 13.

Ex.1002, 31 (annotated).

31. There is simply no indication in the examiner's reasons of allowance of any presupposition of timing or that the additional acceptance analysis only operates on plausible objects.

32. In sum, for all of the reasons discussed above, Patent Owner's proposed construction of "*performing an additional acceptance analysis*" should be rejected.

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It is my opinion that the plain and ordinary meaning of this term should be adopted for this claim term.

B. “*storing interrelationships of the plurality of edge segments in a mathematical tree structure*”

33. In the POR, Patent Owner addresses “*storing interrelationships of the plurality of edge segments*” separately from “*a mathematical tree structure.*” POR, 14-18, 22-25. However, Patent Owner’s arguments regarding “*storing interrelationships of the plurality of edge segments*” are entirely focused on the “*mathematical tree structure*” (see POR, 14-18), with Patent Owner concluding that “a person of ordinary skill would therefore understand the intrinsic record to require a single, connected mathematical tree that stores the interrelationships of the previously identified plurality and that is then traversed as a unit in the next step.” POR, 18. When directly addressing “*a mathematical tree structure,*” Patent Owner asserts that “*a mathematical tree structure*” “means a single connected tree storing the interrelationships of the previously identified plurality, not a forest of disconnected trees.” POR, 25. Taken together as used in claim 1, Patent Owner’s construction of “*storing interrelationships of the plurality of edge segments in a mathematical tree structure*” is “a single, connected mathematical tree, not a forest of disconnected trees, that stores the interrelationships of the previously identified plurality and that is then traversed as a unit in the next step.” This unduly narrow

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interpretation is not supported by the claim language, the rest of the specification, or the extrinsic evidence.

34. Patent Owner's unduly narrow interpretation of "*storing interrelationships of the plurality of edge segments in a mathematical tree structure*" is not supported by the claim language, the rest of the specification, or the extrinsic evidence. The single tree, non-forest requirement Patent Owner attempts to limit the claims to is not described in the claims or the rest of the specification of the '805 patent. The detailed description of the '805 patent explains that "the extracted edges and segments are able to be advantageously stored in a **hierarchically organized tree structure** in the image data. **Many different proven methods for creating and organizing such a hierarchical tree structure are available** to one skilled in the art." Ex.1001, 4:43-47. Far from limiting "*a mathematical tree structure*" to a single tree or excluding forests, this description explicitly supports a broad interpretation that encompasses "many different proven methods for creating and organizing" a mathematical tree structure, including the "scale-space segment **tree**" of Huttenlocher relied upon in my previous Declaration in paragraphs 105-108 where "[e]ach segment in **the tree** is indicated by its label from Figure 3, and by the type of segment: straight, curve, and open-curve."

35. To support its argument, Patent Owner relies entirely on an extrinsic document—Sedgewick (Ex.2006). However, the '805 patent explicitly notes that the

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reference to Sedgewick “is made here **exemplarily**,” not to limit the understanding of “*a mathematical tree structure*” or provide a definition. Ex.1001, 4:47-51. Regardless, Sedgewick itself contradicts Patent Owner's position for at least three reasons.

36. First, Patent Owner and Patent Owner's expert, Dr. Majumder, conflate “*a mathematical tree **structure***” with “a mathematical tree.” POR, 22-25; Ex.1073, 26:21-27:4. Patent Owner alleges that Sedgewick distinguishes a “tree” from a “forest.” POR, 23. However, Sedgewick does not distinguish a “forest” from “*a mathematical tree structure*.” This is because—contrary to Patent Owner's proposed construction—Sedgewick teaches a forest is an example of *a mathematical tree structure*. Ex.2006, 43-44.

37. The '805 Patent specifically references Chapter 4 of Sedgewick for “the comprehensive compilation and discussion of **widely varying tree structures**.” Ex.1001, 4:47-51. Sedgewick's Chapter 4 is titled “**Trees**” and includes an entire section on “**Forests**,” explaining how “**any forest** can be represented as **a binary tree**” and that in some instances “**forests** [are] easier to deal with than nearly **any other kind of tree**.” Ex.2006, 35, 43-44. Contrary to Patent Owner's arguments otherwise, the very chapter of Sedgewick referenced by the '805 patent teaches that a forest is an example of *a mathematical tree structure*. *Id.*

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38. Second, the claims of the '805 patent do not include any language indicating that “*a mathematical tree structure*” is limited to a single tree. To the contrary, claim 1 of the '805 patent uses the transitional phrase “the method comprising” and then limitation [1.4.0] recites “... *storing interrelationships of the plurality of edge segments in a mathematical tree structure*” without any specification as to the number of trees in the mathematical tree structure or the interrelationship (or lack thereof) between the number of trees in the mathematical tree structure. Further, none of the dependent claims of the '805 patent limit the “*mathematical tree structure*” to Patent Owner's single tree, non-forest requirement. Simply put, the claims of the '805 patent are not limited to a single tree, nor do they exclude forests made up of multiple trees.

39. Third, the detailed description and prosecution history of the '805 patent do not limit “*storing interrelationships of the plurality of edge segments in a mathematical tree structure in a mathematical tree structure*” to a single tree. Patent Owner does not identify any embodiments in the specification of the '805 patent limiting “*a mathematical tree structure*” to a single tree or excluding a forest. POR, 9-12. Further, the extrinsic evidence Patent Owner relies on contradicts Patent Owner's position. As discussed above, Chapter 4 of Sedgewick—referenced by the '805 patent for its “discussion of *widely varying tree structures*”—includes an entire section on “forests.” Ex.2006, 43-44. Patent Owner provides no evidence from the

specification or prosecution history for excluding Sedgewick's example of forests as a type of mathematical tree structure from the claim scope. And the '805 patent itself describes a tree traversal algorithm where "the individual branches are systematically processed, beginning with the start nodes of the tree." Ex.1001, 4:61-65 (citing Sedgewick 1998, Chapter 5.6). For any given tree, its root is its starting node, from which all branches form. Accordingly, processing branches for multiple start nodes of a tree implies a collection of trees in a larger tree structure. Accordingly, the plain text of the '805 patent itself and its file history do not support limiting *a mathematical tree structure* to a single tree.

40. In sum, for all of the reasons discussed above, Patent Owner's proposed construction of "*storing interrelationships of the plurality of edge segments in a mathematical tree structure*" is unduly narrow. It is my opinion that the plain and ordinary meaning of this term should be adopted for this claim term.

C. "*potential destination*"

41. Patent Owner argues that "*potential destination*" means "a fixed, physically meaningful endpoint discoverable from geometric cues in the image, not a moving vehicle." POR, 21. Patent Owner's unduly narrow interpretation of "*potential destination*" is not supported by the claims, the rest of the specification, or the prosecution history of the '805 patent

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42. Patent Owner's unduly narrow interpretation of "*potential destination*" is not supported by the claims, the rest of the specification, or the prosecution history of the '805 patent. Claim 1 recites "*at least one potential destination relative to the motor vehicle*" without any limitation as to the type of destination. Ex.1001, 7:57-8:23. There is nothing in the claims requiring the destination to be fixed or stationary. The language of claim 1 also indicates that the "*potential destination*" is not limited to a stationary object because "*image data*" is "*acquired ... using an imaging sensor from a surrounding field of the motor vehicle,*" and the "*potential destination*" is "*extract[ed] from the acquired image data.*" Ex.1001, 7:59-63.

43. While the specification of the '805 patent provides an example of "maneuvering trucks toward docking stations," the claims are not limited to this embodiment. Further, the '805 patent is not limited to stationary objects such as docking stations. For example, the '805 patent describes "camera-based position detection and **lane control system[s] for motor vehicles.**" Ex.1001, 1:50-54 (discussing DE 10323915.4).

44. In supporting the concept that "*potential destinations*" excludes moving vehicles, Patent Owner's expert points to the abstract of the '805 patent to argue it provides an explicit definition of "potential destination" when it describes bringing a "vehicle to a stop at a specific location, for example in a parking bay or at a loading platform."; Ex.1073, 45:1-46:3 ("Q. So you understand this statement in the abstract

to be an explicit definition of a potential destination? A. Yes.”); Ex.1001, Abstract. However, the abstract's mention of example locations such as “a parking bay or at a loading platform” or stopping a vehicle without using the phrase “potential destination” should not be read as limiting. Those same examples are provided in columns 1 and 2 of the '805 patent specification, , along with other implementations of “vehicle guidance,” such as a “lane control system for motor vehicles.” Ex.1001, 1:10-2:10. Accordingly, Patent Owner's attempts to limit the construction of “*potential destinations*” to a fixed location are improper.

45. In sum, for all of the reasons discussed above, Patent Owner's proposed construction of “*potential destination*” is unduly narrow. It is my opinion that the plain and ordinary meaning of this term should be adopted for this claim term.

VI. DETAILED PATENTABILITY ANALYSIS

46. As I explained in my previous Declaration, the combination of Broggi, Huttenlocher, and Brady renders obvious claim 1 of the '805 patent. More specifically, I explained in paragraphs 118-126 of my previous Declaration that Broggi alone or in view of Huttenlocher renders obvious “*performing an additional acceptance analysis.*” I explained in paragraphs 104-109 of my previous Declaration that Huttenlocher teaches “*storing interrelationships of the plurality of edge segments in a mathematical tree structure.*” And I explained in paragraph 88 of my previous Declaration that Broggi teaches identifying a “*potential destination*” in the

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same manner as the '805 patent. In view of Patent Owner's arguments, I will further explain below how the prior art renders obvious each of the disputed claim limitations.

A. The prior art teaches “*performing an additional acceptance analysis*” as claimed.

47. As noted above in Section V.A, the prior art teaches “*performing an additional acceptance analysis*” under the plain and ordinary meaning. Further, the prior art teaches “*performing an additional acceptance analysis*” even under Patent Owner's proposed construction.

48. **First**, the prior art teaches “*performing an additional acceptance analysis*” under the plain and ordinary meaning, as I explained in my previous Declaration in paragraphs 118-126. Specifically, I explained at least two ways the prior art discloses or renders obvious “*performing an additional acceptance analysis*” in [1.4.3], including based on Broggi alone (paragraphs 118-124) and based on Broggi in view of Huttenlocher (paragraphs 125-126).

49. With respect to Broggi alone, I detailed in paragraphs 118-119 how Broggi's **detecting “the top part of the bounding box**, which is looked for in a specific region whose location is again determined by perspective and size constraints” and **distance refinement** performed using “stereo-based techniques” renders obvious *performing an additional acceptance analysis* as recited in [1.4.3],

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including analyzing a shape of the image formation of each object in the image data based on knowledge of at least one imaging property of the imaging sensor relative to the surrounding field.

50. With respect to Broggi in view of Huttenlocher, I explained in paragraphs 125-126 that in the combination Huttenlocher's pattern matching technique is "used to detect the top of the preceding vehicle in Broggi" such that "the orientation of a shape relative to the imaging sensor, and therefore distortions of the shape in the image formation, are accounted for by the aligning step of Huttenlocher's pattern matching technique." Accordingly, the Broggi-Huttenlocher combination also renders obvious *performing an additional acceptance analysis* as recited in [1.4.3].

51. **Second**, the prior art teaches "*performing an additional acceptance analysis*" under Patent Owner's proposed construction. My analysis of the prior art and explanations of how Broggi alone and Broggi in view of Huttenlocher disclose or render obvious "*performing an additional acceptance analysis*" under the plain and ordinary meaning also show how the prior art meets all the additional limitations that Patent Owner attempts to read into the claim.

52. Initially, Patent Owner's arguments that the analysis fails to satisfy Patent Owner's proposed construction of "*performing an additional acceptance analysis*" are based on a fundamental mischaracterization of the analysis of the prior

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art provided for limitations [1.4.1] and [1.4.3]. Specifically, Patent Owner incorrectly asserts that “[f]or [1.4.1], Petitioner relies on Broggi’s bottom-corner **and top-of-box searches.**” POR, 33-34. This is simply not true. My analysis of [1.4.1] in paragraphs 110-113 relies on only Broggi’s detection of the bottom corners—using Huttenlocher’s known pattern matching technique. For example, I explained in paragraph 110 that

Broggi is analyzing the image data *for the presence of a geometric object* (e.g., **bottom corners of a preceding vehicle**) associated with a geometrical form (**shape associated with bottom corners of a preceding vehicle**) that may at least partially describe a potential destination (location of the preceding vehicle) so as to identify one or more potential geometric objects (**potential bottom of the bounding box**)

53. Further, my Declaration concludes the analysis of [1.4.1] at paragraph 113 by stating that

Broggi in view of Huttenlocher renders obvious *analyzing the plurality of edge segments for the presence of a geometric object associated with a geometrical form that may at least partially describe a potential destination* (analyzing coarse level descriptions of edge segments for **presence of a bottom corner of a preceding vehicle** associated with **a bottom corner of a model vehicle**) *so as to identify one or more potential geometric objects*

(identifying **potential bottom corners of a preceding vehicle** by
identifying potentially matching image features).

54. My previous declaration relies on Broggi's separate and subsequent step of detecting the top part of the bounding box in the analysis of [1.4.3], not [1.4.1], as reflected in paragraphs 118-122. In addition to this clear mapping of the prior art, paragraph 125 confirms this understanding by explicitly noting: "This alternative position for [1.4.3] is based on using Huttenlocher's pattern matching technique for detecting both **the bottom corners** (see [1.4.1]-[1.4.2]) and **the top of the preceding vehicle [1.4.3]**." Contrary to Patent Owner's assertion, this analysis does not collapse distinct steps into a single step, but instead relies on separate steps of a multi-step process in the same manner as claimed by the '805 patent.

55. Based on this correct understanding of the analysis of the prior art, all of Patent Owner's arguments fail because the prior art mapping set forth in the analysis of limitation [1.4.3] meets Patent Owner's proposed construction.

56. Patent Owner asserts that "*performing an additional acceptance analysis*" should be understood "to mean a separate, subsequent analysis step that operates only on the set of objects previously found plausible by the matching algorithm and evaluates those objects against image-formation constraints determined by the imaging sensor's properties relative to the scene; only objects that pass this analysis are designated 'accepted objects' and stored for trajectory

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computation.” POR, 14. Contrary to Patent Owner's assertions, this is precisely how my analysis in paragraphs 118-126 maps the prior art to the claim language.

57. My analysis in paragraph 110 explicitly maps Broggi's teachings as a multi-step, ordered pipeline analysis that considers image-formation constraints, as Patent Owner argues the claim should be understood to require: “Broggi performs bounding box detection by (1) determining ‘two corners representing the bottom of the bounding box around the vehicle’ and (2) detecting ‘the top part of the bounding box, which is looked for in a specific region whose location is again **determined by perspective and size constraints.**” Broggi describes a first analysis step (identifying “two corners representing the bottom of the bounding box” of a potential preceding vehicle). Broggi describes a second, separate, and subsequent analysis step (detecting “the top part of the bounding box” after locating bottom corners to confirm whether a correct bounding box exists). As explained in paragraphs 110-124, Broggi's second analysis step operates only on the bottom corners previously found plausible utilizing Huttenlocher's matching algorithm. My analysis explicitly notes in paragraph 118, footnote 6, that “‘each object in the image data’ [as used in [1.4.3]] is understood to include the claimed ‘one or more plausible objects.’” And Broggi describes evaluation based on image-formation constraints (“perspective and size constraints” based on, e.g., the known “stereo [camera] set-up”). Ex.1003, ¶¶118-126 (citing Ex.1005, 171-172). Indeed, Broggi's teaching of looking for the

top of the box in a particular portion of the image is like the '805 patent's description of a horizon line to limit where to search for the object. Ex.1001, 7:47-50. Broggi's teaching achieves the same outcome as the '805 patent of excluding "objects, whose position deviates from the usual position of the destination, [] from the further processing." Ex.1001, 6:8-15.

58. Broggi also explains that only objects that pass the second analysis (e.g., by forming a completed a bounding box and associated distance refinement for a preceding vehicle) are designated as an "accepted object" and stored for trajectory computation by determining a desired path and associated steering angle. Ex.1005, 173, Fig. 21. If "no correct bounding boxes exist," then Broggi describes that "a backtracking approach is used" where a different location is checked. Ex.1005, 171 ("a new search for a bounding box is performed"). Thus, the prior art teaches "*performing an additional acceptance analysis*" even under Patent Owner's proposed construction. And notwithstanding Patent Owner's argument that the claims require a "post-bounding-box" acceptance analysis, neither the claims nor Patent Owner's proposed construction require that the "*additional acceptance analysis*" excludes (or is otherwise performed after) a bounding box analysis as taught by both Broggi and the combination of Broggi and Huttenlocher.

B. The prior art teaches “*storing interrelationships of the plurality of edge segments in a mathematical tree structure*” as claimed.

59. My previous Declaration explains in paragraphs 107-108 how Huttenlocher teaches “*storing interrelationships of the plurality of edge segments in a mathematical tree structure*” by storing interrelationships of edge segments in a scale-space segment tree. As I explained in paragraphs 107-108, Huttenlocher describes the use of “a mathematical tree structure” in the context of Figs. 3 and 4, where Huttenlocher explicitly notes “Figure 4 shows this scale-space segment tree. Each segment in the tree is indicated by its label from Figure 3, and by the type of segment: straight, curve, and open-curve.” Ex.1006, 373-374, Figs. 3-4. My analysis in paragraphs 107-108 shows and explains how Huttenlocher’s scale-space segment tree stores the interrelationships of the plurality of edge segments in a hierarchical manner based on granularity and relative position. The ’805 patent itself notes that “[m]any different proven methods for creating and organizing such a hierarchical tree structure are available to one skilled in the art[.]” Ex.1001, 4:45-51. As explained in paragraphs 107-108, the approach described by Huttenlocher is one example of these known methods of creating and organizing a mathematical tree structure in the context of image processing. Based on Huttenlocher’s explicit description of storing the interrelationships of edge segments in a “**scale-space**

segment tree," Huttenlocher expressly teaches "storing interrelationships of the plurality of edge segments in a mathematical tree structure," as claimed.

60. Patent Owner alleges a failure to show "processing that same tree structure to search for and validate a destination-describing geometric form." POR, 49. My analysis explains in paragraph 104 that "[i]n the combination, Broggi implements Huttenlocher's known pattern matching technique—that segments edges, stores edges segments in a **multi-scale tree**, and analyzes the edge segments—as part of detecting the location of a preceding vehicle." My analysis explains in paragraphs 111-112 that Huttenlocher's pattern matching technique involving its tree structure is used in [1.4.1] "to identify geometrical features in the image that 'potentially match' with corresponding features of an object (bottom corners of a preceding vehicle in the combination with Broggi[.]" My analysis also explains in paragraphs 125-126 that "Huttenlocher's pattern matching technique" is used in [1.4.3] "to detect the top of the preceding vehicle in Broggi[.]" Accordingly, my analysis shows that Huttenlocher teaches "*a mathematical tree structure*," as well as how the combination uses Huttenlocher's tree structure for each of the analysis steps claimed in [1.4.1] and [1.4.3].

61. Even under Patent Owner's construction, Huttenlocher renders obvious "*storing interrelationships of the plurality of edge segments in a mathematical tree structure*." As explained in paragraphs 105-108, Huttenlocher stores "the plurality

of edge segments in a multi-scale mathematical tree structure based on granularity”

For instance, considering the tree identified on page 49 of the POR, the A1 segment (low granularity) is stored based on interrelationships (e.g., granularity and relative position) to the plurality of medium granularity A2, B2, C2, D2, and E2 edge segments, which are in turn stored based on interrelationships to the plurality of high granularity D3, E3, F3, G3, and H3 edge segments. Ex.1006, Figs. 3-4. And as Sedgewick confirms, Huttenlocher's visualization of a multi-rooted tree can easily be represented as a single binary tree. Ex.2006, 43-44. Thus, a POSITA would recognize that notwithstanding Huttenlocher's decision to visually show each of segments A1, B1, C1, etc. as separate trees within a larger tree structure for purposes of clarity, the same tree structure could easily be represented as a single binary tree.

C. The prior art teaches identifying a “*potential destination*” as claimed.

62. The prior art teaches identifying a “potential destination” in the same manner as the '805 patent by automatically identifying from image data a location in the vehicle's surrounding environment. My previous Declaration explains in paragraph 88 how the prior art teaches “the location of a preceding vehicle is a *potential destination relative to the motor vehicle*” in a manner “consistent with how the '805 patent uses the term ‘destination,’ referring to a destination as an object (e.g., cargo door of a dock).” For instance, in paragraph 88 I explained how the “location of preceding vehicle in a platoon” is “a potential destination of the

[following] motor vehicle.” The location of the preceding vehicle is a “*potential destination*” because it represents where the following motor vehicle is potentially going and is identified in the manner required by the claims of the '805 patent. Further, the prior art operates with respect to a “*potential destination*” in the same manner as the '805 patent. For example, as in the cargo door example, a motor vehicle in the platoon of the prior art will automatically drive toward the location of the preceding vehicle but will not run into the preceding vehicle.

63. Indeed, Broggi's identification of a preceding vehicle as a “*potential destination*” and subsequent trajectory determination is analogous to the '805 patent. Patent Owner's portrayal of Broggi as “reactive platooning” ignores that the '805 patent similarly recognizes that “it is particularly advantageous for the trajectory to be constantly readapted ... on the basis of a continuous image analysis[.]” Ex.1001, 6:63-67. The '805 patent also contemplates that “the position of the objects stored as potential destinations in the object list [] be continuously monitored” so that new destinations can be chosen when “the originally most proximate destination can no longer be easily reached due to circumstances[.]” Ex.1001, 7:1-12. Further, Broggi's continuous calculation of a trajectory over time merely represents repeating the elements of claim 1, rather than teaching away from the claim.

64. Finally, Patent Owner's expert, Dr. Majumder, confirmed that a stopped vehicle can be a “*potential destination*” under Patent Owner's proposed

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construction. Ex.1073, 50:3-51:7. There are a number of reasons why a vehicle may be stopped during operation such as Broggi's platooning, beyond being parked. Indeed it would make sense for vehicles to stop for a number of reasons when driving, including stop signs or red lights, waiting to turn, due to an obstacle, etc. A vehicle in Broggi's platoon would simply route to the location of the preceding vehicle, without running into the preceding vehicle, when the preceding vehicle is stopped—in the same way as when the preceding vehicle is moving. Accordingly, at least in instances when the preceding vehicle in Broggi's platoon is stopped (e.g., due to a stop sign, a red light, or while waiting to make a turn), the preceding vehicle is a "*potential destination*" under Patent Owner's proposed construction, and the prior art as set forth in the Petition meets Patent Owner's unnecessarily narrow construction of "*potential destination*."

VII. AVAILABILITY FOR CROSS-EXAMINATION

65. In signing this declaration, I recognize that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I also recognize that I may be subject to cross examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the agreed time for cross-examination.

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VIII. CONCLUSION

66. I hereby declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct, and that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I understand that willful false statements are punishable by fine or imprisonment or both. *See* 18 U.S.C. § 1001.

Date: Feb. 3, 2026

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "JRod", is written over a solid horizontal line.

Jeffrey J. Rodriguez