

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BMW OF NORTH AMERICA, LLC,
Petitioner,

v.

CARRUM TECHNOLOGIES, LLC,
Patent Owner.

IPR2019-00928
Patent 7,925,416 B2

Before LYNNE H. BROWNE, PATRICK R. SCANLON, and
JON B. TORNQUIST, *Administrative Patent Judges*.

BROWNE, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

BMW of North America Inc. (“Petitioner”), on April 20, 2019, filed a Petition to institute *inter partes* review of claims 1–14 of U.S. Patent No. 7,925,416 B2 (Ex. 1001, “the ’416 patent”). Paper 1 (“Pet.”). Carrum Technologies, LLC (“Patent Owner”) filed a Preliminary Response to the Petition on August 16, 2019. Paper 6 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the Petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

After considering the parties arguments and supporting evidence, we determine that Petitioner has not demonstrated a reasonable likelihood that it would prevail with respect to any claim of the ’416 patent. Accordingly, we do not institute *inter partes* review.

A. Related Proceedings

The parties indicate that the ’416 patent is the subject of *Carrum Technologies, LLC v. BMW of North America, LLC*, Case No. 1:18-cv-01645 (D. Del.), *Carrum Technologies, LLC v. FCA US, LLC*, Case No. 1:18-cv-01646 (D. Del.), and *Carrum Technologies, LLC v. Ford Motor Company*, Case No. 1:18-cv-01647 (D. Del.). Pet. 60; Paper 4, 2.

Petitioner indicates further that it “has challenged the ’416 patent in IPR2019-00904 and IPR2019-00905 on different grounds [and that] Unified Patents has also challenged the ’416 patent in IPR2019-00481, addressing only claims 1, 2, 7, and 9-11 and on different grounds.” Pet. 61.

B. The '416 Patent

The '416 patent is directed to “a method and system for controlling a vehicle having an ACC¹ system.” Ex. 1001, 1:12–13. Figure 4, reproduced below, shows the method.

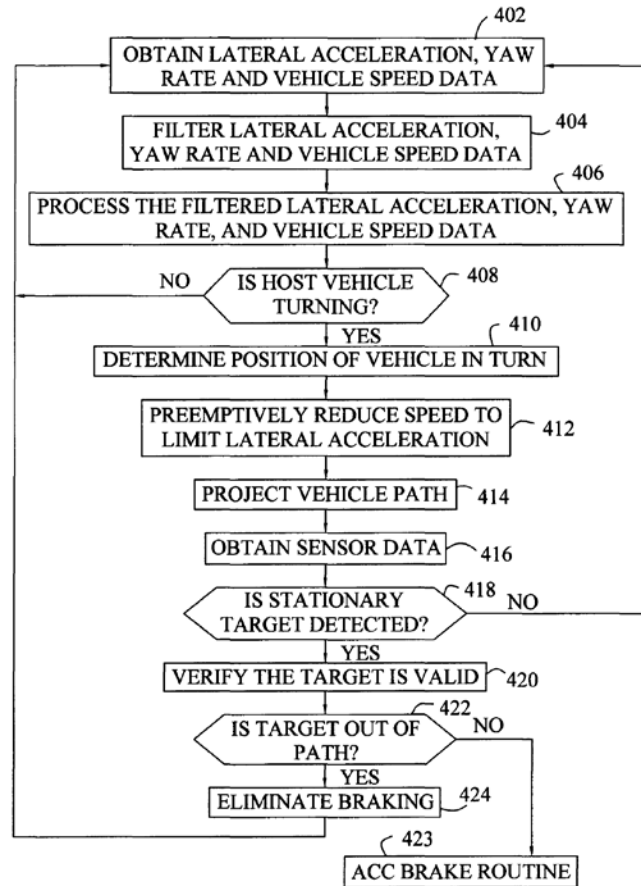


FIG. 4

Figure 4 is a flowchart illustrating the method. *Id.* at 3:58–59. The system used with this method is shown in Figure 2, reproduced below:

¹ Adaptive cruise control.

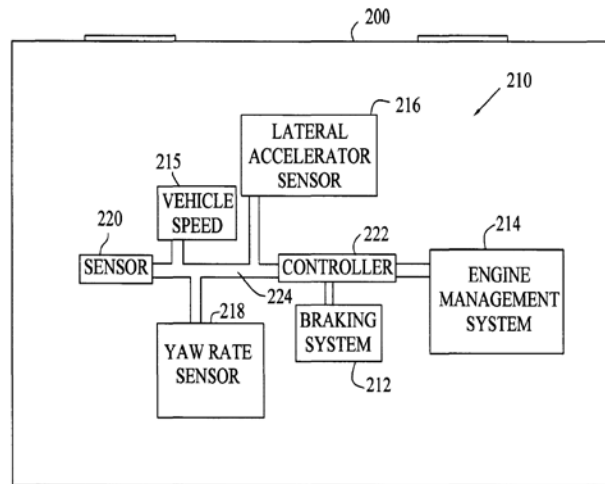


FIG. 2

Figure 2 is a schematic of a vehicle including the system. *Id.* at 3:54–55.

“System 210 is implemented in host vehicle 200 that has braking system 212 and engine management system 214.” *Id.* at 4:16–18. “System 210 includes vehicle speed sensor 215 . . . , lateral acceleration sensor 216 for measuring the acceleration of vehicle 200 in the direction of vehicle’s 200 lateral axis in a turn, and yaw rate sensor 218 for measuring the rate that vehicle 200 is rotating about its vertical axis.” *Id.* at 4:19–23. “System 210 also includes sensor 220 for generating a range signal corresponding to a distance between host vehicle 200 and a target, and a target range rate signal corresponding to a rate that the distance between host vehicle 200 and the target is changing.” *Id.* at 4:23–27.

“As indicated by steps 402–408, controller 222 continuously monitors vehicle’s 302 speed, lateral acceleration and yaw rate, each of which is provided to controller 222 as signals from sensors 215, 216, 218 (FIG. 2).” Ex. 1001, 5:19–23. “At step 402, controller 222 obtains and stores vehicle’s 302 lateral acceleration data, yaw rate data and vehicle speed data.” *Id.* at 5:23–25. “At step 404, controller 222 uses a time lag filter to filter the raw

lateral acceleration, yaw rate and vehicle speed data, and at step 406, controller 222 processes this filtered data.” *Id.* at 5:25–28.

C. Illustrative Claims

Petitioner challenges claims 1–14 of the ’416 patent. Claims 1 and 10 are independent. Both claims are reproduced below:

1. A method of controlling a vehicle having an adaptive cruise control system capable of obtaining a vehicle lateral acceleration, said method comprising the steps of:
 - determining when the vehicle is in a turn based on a detected change in the vehicle lateral acceleration;
 - determining a vehicle path during the turn;
 - detecting an object;
 - determining whether the object is in the vehicle path during the turn;
 - reducing the vehicle speed if the object is determined to be in the vehicle path during the turn; and
 - ignoring the object for braking purposes if the object is determined not to be in the vehicle path during the turn.

Ex. 1001, 8:7–19.

10. A system for use in controlling a vehicle at a vehicle speed, said system including:
 - an adaptive cruise control system;
 - a controller in communication with said adaptive cruise control system and capable of determining when the vehicle is in a turn, said controller operative to reduce the vehicle speed according to a vehicle position in the turn;
 - at least one lateral acceleration sensor for generating a signal corresponding to a vehicle lateral acceleration, said lateral acceleration sensor in electrical communication with said controller and operative to detect a change in the vehicle lateral acceleration; and

at least one object detection sensor for detecting an object in a vehicle path of the vehicle during the turn, said object detection sensor in electrical communication with said controller, wherein said controller includes control logic operative to determine whether the object is in the vehicle path during the turn and ignoring the object for braking purposes when the object is not determined to be in the vehicle path.

Id. at 8:63–9:15.

D. Challenges

Petitioner asserts that claims 1–14 would have been unpatentable on the following grounds:

Claims Challenged	35 U.S.C. §	References/Basis
1, 6, 9	103	Winner, ² Fukada, ³ AAPA ⁴
2–5	103	Winner, Fukada, AAPA, Khodabhai ⁵
7, 8	103	Winner, Fukada, AAPA, Khodabhai
10–14	103	Winner, Fukada, AAPA, Khodabhai

² US 2002/0165657 A1, pub. Nov. 7, 2002. Ex. 1005.

³ US 5,627,756, iss. May 6, 1997. Ex. 1006.

⁴ The Table of Grounds provided in the Petition does not include Applicants Admitted Prior Art (AAPA), however, the explanation of the challenge to claims 1, 6, and 9 includes AAPA. *Compare* Pet. 10 with Pet. 13–16, 18, 23.

⁵ US 5,959,569, iss. Sept. 28, 1999. Ex. 1007.

II. ANALYSIS

A. *Legal Standard*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and, when presented, (4) objective evidence of nonobviousness.⁶ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze the asserted grounds of unpatentability in accordance with these principles.

B. *Level of Ordinary Skill in the Art*

Petitioner asserts that

A person of ordinary skill in the art (“POSITA”) at the time the ’416 patent was filed would have a bachelor’s degree in electrical engineering, computer engineering, or a related engineering discipline and two to three years of industry experience in the field of automotive control systems or automotive engineering, or equivalent experience, education, or both.”

Pet. 9 (citing Ex. 1004 ¶ 22). Petitioner asserts further that “[t]he person would also have knowledge or familiarity with in-vehicle computing.” *Id.* Patent Owner “does not dispute Petitioner’s definition of a POSA.” Prelim. Resp. 2 (citing Pet. 9). Accordingly, for the purposes of this Decision, we

⁶ We note that at this time no objective evidence of nonobviousness has been presented by Patent Owner.

adopt Petitioner’s definition, which is reasonable because it appears consistent with the evidence at this stage of the proceeding, including the ’416 patent and the asserted prior art.

C. Claim Construction

In an *inter partes* review proceeding for a petition filed on or after November 13, 2018, a patent claim shall be construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340, 51,358 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.100(b) (2019)). This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. Under that standard, the words of a claim are generally given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification.

See Phillips, 415 F.3d at 1312–13. “[W]here a party believes that a specific term has meaning other than its plain meaning, the party should provide a statement identifying a proposed construction of the particular term and where the disclosure supports that meaning.” Office Trial Practice Guide, 77 Fed. Reg. 48,756, 48,764 (Aug. 14, 2012).

Petitioner asserts that “[t]he plain meaning should be applied to all claim terms. For the purposes of this Petition, no explicit construction is needed.” Pet. 9. For claims 1–10, Patent Owner agrees. *See* Prelim. Resp. 15. For claims 11–14, Patent Owner contends that these claims “are

presumed to be means-plus-function claims and Petitioner has failed to rebut this presumption, or to provide the Board with its proposed construction for these [means-plus-function] terms, as 37 C.F.R. § 42.104(b)(3) requires.” *Id.* at 15. Thus, according to Patent Owner, “Petitioner’s pleading failure is fatal to its challenge of claims 11–14.” *Id.*

In view of our analysis discussed below, we do not discern a need to construe explicitly any claim term of the ’416 patent, because construing these terms is not necessary for us to assess the asserted grounds of unpatentability. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co., Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

D. Ground 1 — Obviousness of Claims 1, 6, and 9 over Winner and Fukada

Petitioner contends the subject matter of claims 1, 6, and 9 would have been obvious over the combined disclosures of Winner and Fukada. Pet. 10–24.

Winner discloses “a method of controlling the speed of a vehicle” as a function of the speed of or distance from a vehicle travelling ahead in the same lane. Ex. 1006 ¶ 1. Winner explains that it was known in the art to use radar mounted in the front area of a vehicle to determine the position of objects in a vehicle’s path and to adjust the travel speed of a host vehicle accordingly. *Id.* ¶¶ 3–5. Winner further explains that travelling along a curve represents a critical situation for cruise control systems because the predefined travel speed may be too high for travelling along the curve and

the limited detection range of the radar in a curve may delay detection of target vehicles. *Id.* at 5

Winner notes that yaw rate or transverse acceleration acting on the ACC vehicle may be evaluated in order to limit the speed of a vehicle in a curve. *Id.* ¶ 6. “In this way, however, a curve is not detected until the vehicle is in the curve,” which Winner asserts “is too late to meaningfully predict the vehicle’s path.” *Id.*

In the method of Winner, “in addition to or instead of transverse acceleration,” a host vehicle uses its forward radar to detect when a target vehicle reaches the limits of the radar detection range or leaves the radar detection range when no change of lanes takes place. *Id.* ¶ 8. In the situation where the radar sight range is limited by the “course of the road,” Winner teaches that the lateral acceleration limit applied by the host vehicle becomes “stronger.” *Id.* ¶¶ 9–10. Likewise, when the forward vehicle stays in the same lane but is lost to radar due to a curve, this type of object loss may be recognized and the acceleration of the ACC vehicle limited accordingly. *Id.* ¶¶ 11–12. According to Winner, by combining the aforementioned different approaches, the transverse acceleration of the controlled vehicle “is advantageously refined.” *Id.* ¶¶ 7–8 (disclosing that the system “advantageously ensures reliable operation” of the ACC system in curves).

1. *Fukada*

Fukada discloses “a device for controlling turn behavior of a vehicle so as to suppress and reduce undesirable behavior such as drift out or spin which can occur during turn of a vehicle such as an automobile.” Ex. 1006, 1:7–10. The disclosed device has means for detecting lateral acceleration,

vehicle speed, yaw rate, and for “presuming turn behavior of the vehicle.” *Id.* at 2:1–4.

According to Petitioner, in Fukada, “[w]hen lateral acceleration is obtained, the magnitude of the change in the vehicle’s lateral acceleration over a predetermined time is calculated and compared to a preset standard.” Pet. 13 (citing Ex. 1006, 19:55–67; Ex. 1003 ¶ 41). Petitioner explains further that “[i]f the change in lateral acceleration exceeds the standard,” the device of Fukada “sends signals to the engine to reduce the vehicle’s lateral acceleration.” *Id.*

2. AAPA

The ’416 patent discusses features and problems of prior art ACC systems. Ex. 1001, 1:64–2:43; Pet. 15. Figure 1 of the ’416 patent is reproduced below:

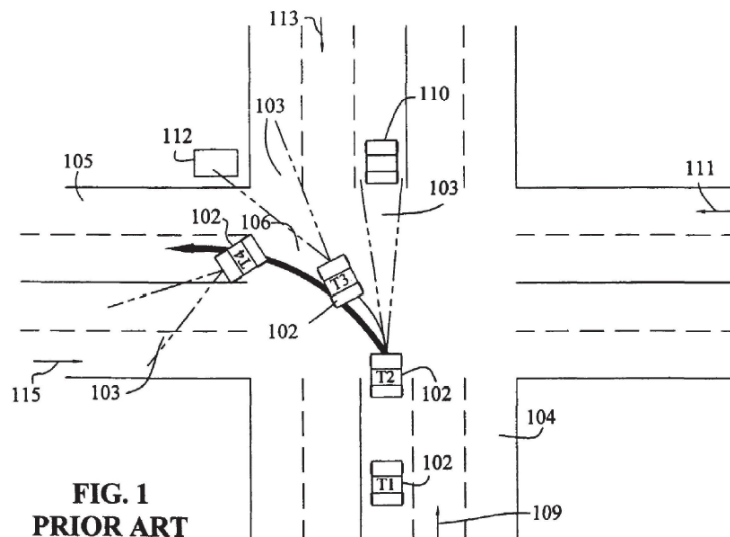


Figure 1 is a diagrammatic view of a vehicle having a prior art ACC system in a turn situation. Figure 1 shows problems that may occur when a host vehicle having an ACC system is at time points T1–T4. The ’416 patent reports that one problem present at time points T2 and T3 is that the prior art ACC systems were “not capable of disregarding the stationary

targets not within the vehicle's path (i.e., 'out-of-path' targets)," such as stationary objects 110 and 112. *Id.* at 2:1–24. Another problem presented by prior art ACC systems "is that the systems' maintenance of a set cruise speed in turning situations may cause excessive lateral acceleration and the possible loss of control of the host vehicle." *Id.* at 2:32–36. This is indicated as time point T4 in Figure 1. *Id.* at 2:36–40.

4. *Petitioner's Allegations*

Petitioner addresses each limitation of independent claim 1, explaining how either Winner or Fukada meets each one. Pet. 10–24. Petitioner asserts that "*Winner* describes an ACC system for controlling the speed of a host vehicle as a function of another vehicle traveling ahead in the same path, particularly in curves." *Id.* at 16 (citing *Winner* ¶¶ 1, 5, 8; Ex. 1004 ¶ 45). Based on Winner's disclosure, Petitioner asserts that "one of skill in the art would have sought prior art that discloses how to determine when the host vehicle is entering a curve, which is the same as a turn" and "*Fukada* fills that gap, disclosing how to determine when a vehicle is turning using a change in the vehicle's lateral acceleration." *Id.* at 16 (citing Ex. 1004 ¶ 46; Fukada, 2:1–8, 19:55–65). Petitioner asserts further that "combining *Winner* with *Fukada* would have been predictable and yielded no unexpected results" and "*Winner* and *Fukada* are also in the same field of endeavor." *Id.* at 16–17. In addition, Petitioner asserts that "as the applicants admit, it was a known problem of prior art ACC systems that 'the systems' maintenance of a set cruise speed in turning situations may cause excessive lateral acceleration and the possible loss of control of the host vehicle.'" *Id.* at 17–18 (quoting Ex. 1001, 2:36–47). Based on this assertion, Petitioner contends that "one of skill in the art would have sought prior art

that discloses how to determine when the host vehicle is entering a turn.” *Id.* at 18 (citing Ex. 1004 ¶ 50).

5. Patent Owner’s Response

Patent Owner responds that “Petitioner fails to provide the required explanation for why a POSA reading *Winner* would ‘have sought prior art that discloses how to determine when the host vehicle is entering a curve.’” Prelim. Resp. 26. According to Patent Owner, “that proposition would make little sense, because *Winner itself* teaches how to determine when the host vehicle is entering a curve, based on radar detection that a vehicle traveling ahead has entered a curve.” *Id.* (citing Ex. 1006 ¶¶ 11–12; *Apple Inc. v. Luxembourg S.A.*, IPR2017-02041, Paper 10 (PTAB Mar. 8, 2018) (denying institution because “Petitioner, however, fails to articulate or show sufficiently why achieving a Passwordable ID with uniqueness to a device and user would be necessary or helpful to [the cited reference’s] system . . . For instance, Petitioner does not address whether [the cited reference’s] existing methods of generating a Passwordable ID already attain such uniqueness.” (citation omitted))). Thus, Patent Owner contends that “*Winner* did not present a POSA with a problem to be solved regarding ‘how to determine when the host vehicle is entering a curve.’” *Id.* (quoting *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349–50 (Fed. Cir. 2000) (affirming finding of nonobviousness where “there was no apparent disadvantage” to the prior art mechanism)).

6. Analysis

We agree with Patent Owner. As *Winner* discloses methods for identifying when a vehicle has entered a curve (measuring transverse acceleration and using the forward facing radar), it is not evident why one of ordinary skill in the art would have looked to Fukada to obtain additional

methods of determining curve entry. Ex. 1005 ¶¶ 11–12. To the extent that Petitioner is relying on alleged AAPA⁷ to provide reasoning in support of the proposed combination, we note that identification of a problem “is not an admission that this problem was known or appreciated by others.” *Endo Pharm. Inc. v. Actavis LLC*, 922 F.3d 1365, 1376 (Fed. Cir. 2019) (quoting *Innogenics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008))). Thus, we are not persuaded by Petitioner’s argument.

For these reasons, the Petition fails to establish a reasonable likelihood that Petitioner would prevail with respect to the challenge to claim 1. Petitioner’s challenge to claims 6 and 9, as set forth in Ground 1, suffers from the same deficiencies. Accordingly, we are not persuaded that Petitioner would prevail with respect to the challenges to claims 6 and 9.

E. Grounds 2–4

Each of Grounds 2–4 relies on the same unpersuasive argument, discussed in Part II.D.4 above, to support Petitioner’s showing of a reasonable likelihood of prevailing. See Pet. 25–58. Petitioner’s arguments with respect to the additional prior art relied upon in these challenges do not cure the deficiency discussed in Part II.D.6. Thus, Petitioner’s challenge for each of these grounds fails for reasons discussed in this Part of our Decision.

Accordingly, the Petition fails to establish a reasonable likelihood that Petitioner would prevail with respect to the challenges to claims 2–5, 7, 8, and 10–14 as set forth in Grounds 2–4.⁸

⁷ It is not necessary to our decision that we determine whether or not the portions of the Specification identified by Petitioner constitute AAPA, because we find Winner already has a system for determining when the host vehicle is in a turn.

⁸ We note that, although we do not need to reach this issue, Petitioner’s failure to provide a claim construction for the means-plus-function

F. Conclusion

For the reasons discussed in Parts II.D–E, we do not institute *inter partes* review of the '416 patent.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* as to the challenged claims of the '416 patent; and

FURTHER ORDERED that no *inter partes* review is instituted.

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limitations in claims 11–14 is further indication that there is no reasonable likelihood that Petitioner would prevail with respect to the challenge to these claims.