

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZENDRIVE, INC.,
Petitioner,
v.
CAMBRIDGE MOBILE TELEMATICS INC.,
Patent Owner.

Case No. IPR2023-01440

U.S. Patent No. 10,672,249 B1

**PETITION FOR *INTER PARTES*
REVIEW OF U.S. PATENT NO. 10,672,249**

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LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,672,249 B1 to Balakrishnan et al.
1002	File History of U.S. Patent No. 10,672,249 B1 to Balakrishnan et al.
1003	Declaration of Scott Andrews
1004	U.S. Patent No. 10,567,919 B2 to Schmitt et al.
1005	U.S. Patent No. 9,796,391 B2 to Olson et al.
1006	U.S. Patent No. 9,692,879 B1 to Lack
1007	Docket from <i>Cambridge Mobile Telematics, Inc. v. Zendrive, Inc.</i> , Case No. 1:22-cv-01260 (D. Del.)
1008	U.S. Patent No. 9,053,516 to Stempora
1009	U.S. Patent No. 10,158,977 B2 to Cordova
1010	Horrey et al., “In-Vehicle Glance Duration: Distributions, Tails, and Model of Crash Risk,” Transportation Research Record (Dec. 2007)
1011	Excerpt from Maloney, “Dutton’s Navigation & Piloting” (14 th Ed., 1985)
1012	Barbour et al., “Micromachined Inertial Sensors for Vehicles,” IEEE, 1058-1063 (1998)
1013	U.S. Patent No. 3,197,880 to Rice
1014	Ettelt et al., “A New Low Consumption 3D Compass Using Integrated Magnets and Piezoresistive Nano-Gauges,” Transducers ’11, 40-43 (June 5-9, 2011)
1015	Excerpt from Zhao, “Vehicle Location and Navigation Systems” (1997)

1016	Nowakowski et al., “Map Design: An On-the-Road Evaluation of the Time to Read Electronic Navigation Displays,” Technical Report UMTRI-98-4 (June 1998)
1017	Fleming et al., “Driver Performance and Memory for Traffic Messages: Effects of the Number of Messages, Audio Quality, and Relevance,” Technical Report UMTRI 98-22 (June 1998)
1018	U.S. Patent No. 6,122,682 to Andrews
1019	JP H10-232992 to Nojima (and associated translation)
1020	Excerpt from Resnick et al., “Physics, Part I” (1966)

I. Introduction

Petitioner respectfully requests the Board institute IPR of claims 1-10 of U.S. Patent No. 10,672,249 (“the ’249 patent”), which is assigned to Cambridge Mobile Telematics Inc. (“Patent Owner”).

The ’249 patent is directed to a method for determining whether the driver of a vehicle is distracted by a mobile device. The patent’s method begins by detecting if the device is on a trip. Then, “detector” data is analyzed to determine if the device is moving and is being used in way that indicates driver distraction. As the patent concedes, using a mobile device to determine distraction was well known in the prior art. The ’249 patent attempts to distinguish its invention from the prior by considering multiple events. In particular, the patent’s method considers whether multiple “distraction events” occurred sufficiently close in time such that they form a “distraction episode.” According to the patent, this “distraction episode” can be assessed to distinguish merely “possible” episodes from episodes that are “true.”

The claimed invention was not new. This Petition focuses on two exemplary references: (1) U.S. Patent No. 10,567,919 B2 (Ex. 1004, “Schmitt”) and (2) U.S. Patent No. 9,796,391 B2 (Ex. 1005, “Olson”).

Schmitt—like the ’249 patent—teaches a method and system for determining whether a driver is distracted by a mobile device. The system first ascertains whether the device is on a trip in a vehicle. Then, it uses sensor data to detect what it calls

“usage events.” These “usage events” can entail both device movement (detected using, for example, accelerometers within the mobile device) and usage of the device (such as locking/unlocking or application use). Next, like the ’249 patent, Schmitt’s system determines if individual “usage events” occurred close enough in time to form a continuous usage “session.” Schmitt’s system also applies a risk score to the session. If the score exceeds a threshold, responses like notifications or device disabling can be triggered. As discussed in Ground 1, Schmitt renders claims 1-10 obvious.

Patent Owner may argue that Schmitt’s threshold-crossing risk scores do not indicate distraction with a sufficient degree of certainty to constitute determining that “a possible distraction episode comprises a true distraction episode” as claimed. While this would be wrong—a POSITA would have considered it highly obvious that Schmitt’s risk scores can be used for this purpose—the claims would still be obvious over the combination of Schmitt and Olson. Olson, like both the ’249 patent and Schmitt, teaches a system for detecting whether a vehicle driver is distracted by a user device. It employs the same types of sensors and information as the ’249 patent and Schmitt. And, Olson also considers multiple events together. For example, when determining whether there has been distraction, Olson assesses whether threshold number of related “distraction instances” occurred within a pre-defined “time interval.” Olson also teaches that its system distinguishes “merely ...

suspicious” from “certain” distractions. Olson then teaches that the system provides more serious responses (like device disabling) in response to “certain” distractions than it does to “merely ... suspicious” distractions (which trigger simple notifications). Applying Olson’s express teaching about distinguishing “suspicious” distractions from “certain” distractions to the disclosure of Schmitt renders the claims obvious. This is explained in more detail in Ground 2.

Finally, due to its similarity with the ’249 patent, Olson itself separately renders claims 1-10 obvious as explained in Ground 3.

II. Mandatory Notices

A. Real Party-in-Interest

Petitioner Zendrive, Inc. is the real party-in-interest.

B. Related Matters

Patent Owner is asserting the ’249 patent in *Cambridge Mobile Telematics, Inc. v. Zendrive, Inc.*, Case No. 1:22-cv-01260 (D. Del.).

C. Counsel, Service, and Fee Information

Petitioner designates the following counsel:

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Petitioner consents to service by electronic mail at the addresses listed in the table above. Petitioner's Power of Attorney is attached.

The USPTO is authorized to charge the filing fee and any other fees incurred by Petitioner to the deposit account of Orrick, Herrington, & Sutcliffe LLP: 15-0665.

III. Requirements for IPR

A. Grounds for Standing

Petitioner certifies that the '249 patent is available for IPR, and that Petitioner is not barred or estopped from requesting this IPR. Petitioner was served with a complaint alleging infringement of the '249 patent on September 26, 2022. As required by 35 U.S.C. § 315(b), the present petition was filed within 1 year of this date of service.

B. Identification of Challenge and Statement of Precise Relief Requested

Petitioner requests IPR of claims 1-10. This petition discusses claim construction, explains why the claims are unpatentable, provides details regarding where the various claim limitations are found in the prior art, and is supported by the accompanying Declaration of Scott Andrews (Ex. 1003), a leading expert in the vehicle safety, sensor, telematics, and communications fields.

The application underlying the '249 patent—U.S. App. 16/403,761—was

filed May 6, 2019. The patent does not claim priority to any other applications. (Ex. 1001, Cover.)

Petitioner relies on the following references: (1) Schmitt (Ex. 1004) and (2) Olson (Ex. 1005). Both references are prior art. (See Section VIII.)

Petitioner challenges the claims on the following grounds:

Ground 1: Claims 1-10 are obvious over Schmitt.

Ground 2: Claims 1-10 are obvious over Schmitt and Olson.

Ground 3: Claims 1-10 are obvious over Olson.

IV. Institution Should Be Granted

Petitioner has established a reasonable likelihood of success on the merits. And, all other requirements for IPR have been met. The Board should institute IPR.

A. There Are No Grounds for a § 314 Discretionary Denial in this Case

There is a pending district court action involving the '249 patent. In appropriate circumstances, the Board may consider the factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019 Paper 11, (PTAB Mar. 20, 2020) ("*Fintiv*") when determining whether institution should be granted in light of the pendency of such an action. But, "the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of a parallel district court litigation where a petition presents compelling evidence of unpatentability." 6/21/22 Interim Procedure, p. 2. In other words, "compelling, meritorious challenges will be allowed to proceed at the PTAB

even where district court litigation is proceeding in parallel.” *Id.*, pp. 4-5. Petitioner submits that this is the case here: as explained below, the claims of the ’249 patent are plainly and unambiguously unpatentable in view of the prior art.

Separate from the strength of the petition, the co-pending district court action involving the ’249 patent remains in an early stage. No claim construction has occurred, no substantive motions (beyond a motion to dismiss other asserted patents under § 101) have been filed, and the parties served their first sets of discovery requests less than a month ago. (*See generally* Ex. 1007.) While a trial date has been tentatively scheduled for June 9, 2025 (*see id.*), this falls after the expected date of final written decision. All these factors weigh in favor of institution. *See Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 8-9, 11 (PTAB June 16, 2020).

B. Denial Under § 325(d) Would Be Inappropriate

The arguments set forth in this petition are different from those addressed by the Patent Office during prosecution. Olson and Schmitt were not cited by Patent Owner or considered by the Examiner. (*See generally* Ex. 1002.) As explained in Section V.B below, the prior art references that were addressed during prosecution purportedly failed to teach the determination of “distraction episodes” including multiple, discrete “distraction events.” In contrast, Schmitt and Olson teach systems and methods that detect and assess not only individual events, but also episodes

comprising a series of related events. Thus, this prior art is substantively different from and overcomes any purported deficiencies identified in connection with the art considered by the Examiner.

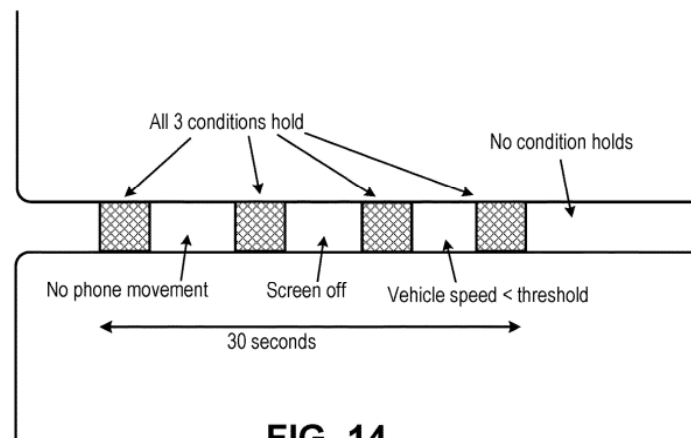
V. The '249 Patent

A. Overview

The '249 patent relates to a method for “determining and reporting mobile phone distraction of a driver.” (Ex. 1001, 1:7-8.) The patent admits that numerous “existing systems” use mobile device “sensor data”—like GPS, accelerometer, and gyroscope data—to detect distraction. (*Id.*, 1:12-24.) “[E]xisting systems” also use an “application” running on the device to “automatically detect[] the start and stop of each trip” using “location” information, and then “gather[] sensor data” for purposes of “accurately estimate[ing] both the dynamics of the vehicle and the movement patterns of the mobile phone within the vehicle.” (*Id.*, 1:31-51.) A distraction is determined to have occurred if “three conditions ... all hold true”: “A. Phone movement as inferred from gyroscope and/or accelerometer data. B. User interacting with phone, inferred particularly from phone screen state and phone-lock state. C. The vehicle speed during the segment exceeding a threshold” determined via GPS. (*Id.*, 3:5-15.) The collected data can be used to generate a “scor[e]” or “assessment of phone distraction.” (*Id.*, 2:12-29.)

The '249 patent operates in the same general way as existing systems: it employs mobile device sensors to detect phone movement, phone usage, and vehicle movement to determine if a driver is distracted. (*See id.*, 2:46-47 (“[T]he existing method builds on the approach” of the prior art).) But, the patent also proposes certain purported “improvements” and “enhancements.” (*Id.*, 3:46-47.) These include “[t]he construction and use of ‘distraction episodes’ to assess, score, and inform users of phone distraction occurring on a trip” and “[t]he use of additional factors, termed ‘distraction context’, to identity user interaction with the phone in addition to screen state and phone-lock state....” (*Id.*, 3:47-61.)

The '249 patent explains that a “distraction episode” is “determined based on aggregations of one or more distraction events.” (*Id.*, 10:60-61.) Figure 14 provides an example:



(*Id.*, Fig. 14.) “Each of the intermittent periods” (the darker crosshatching) “can be considered distraction events” because they represent times during which the mobile

device is moving, the user is interacting with the device, and the vehicle speed exceeds a threshold. (*Id.*, 1:10-12.) But allegedly unlike existing systems, the patent “avoids treating each” of the detected events “as a separate distraction episode, a treatment that would be inconsistent with the fact that the driver was effectively engaged in a distraction episode for the entire 30-second period....” (*Id.*, 11:12-17.) Thus, in the ’249 patent, the various “distraction events” are grouped into a “distraction episode” spanning the entire 30-second period. (*See id.*)

Next, the ’249 patent explains that its system can also consider “distraction context.” (*Id.*, 3:47-61.) “[D]istraction context ... broadly ... include[s] ... one or more circumstances or conditions associated with a distraction episode.” (*Id.*, 4:4-6.) The patent includes numerous examples of contextual information such as “whether the user is currently on a call,” “the identity of the foreground app ... running on the phone,” “tapping on the screen,” and “motion of the vehicle ... indicative of the driver possibly being distracted[.]” (*Id.*, 12:65-13:20.) Other examples include the device’s “orientation” and “operational states,” “[w]eather and [a]mbient conditions[.]” or the “time” when distraction occurs. (*Id.*, 15:17-22, 16:12-28.) This contextual information can be used to “scor[e] ... a relevant distraction episode....” (*Id.*, 12:63-65; *see also id.*, 9:21-25.)

Finally, the patent’s system also engages in a two-step determination process: it first determines if there is a “possible distraction episode,” and then it determines

that this “possible distraction episode is a true distraction episode.” (*Id.*, 4:63-5:2.) The patent does not explain what makes a distraction “true.” It does, however, provide a handful of examples of the *kinds* of secondary analyses that can be applied to possible distraction episodes. For instance, “user feedback” can be “collect[ed] and leverage[d.]” (*Id.*, 16:40-43.) Or, whether the “time period spanned by the possible distraction episode is longer than a predetermined length” can be considered. (*Id.*, 4:63-5:2.) The system can also “[s]cor[e] relevant distraction episodes” in an effort to “better capture[] crash risk.” (*Id.*, 9:21-25; *see also* Ex. 1003, ¶¶ 104-131.)

B. Prosecution History

All of the originally filed claims of the ’249 patent were rejected in July 2019. (*See* Ex. 1002 at 82-102.) In addition to a double patenting rejection, the claims were rejected as obvious over U.S. Pub. 2016/0006860 to Neitzel and U.S. Pub. 2017/0105098 to Cordova. (*Id.* at 86.)

The applicant responded with an amendment in October 2019. (*See id.* at 119-136.) Here, the applicant argued that Neitzel only “detected a single instance for which the described criteria for disabling the device is met and did not attempt to detect another instance until after the vehicle had stopped and the process was allowed to restart.” (*Id.* at 124.) Thus, Neitzel purportedly did not teach “determining a distraction episode that spans two or more of the discrete distraction

events during the trip.” (*Id.*) Cordova also purportedly “described identifying a single instance of driver distraction” and not multiple distraction events forming a distraction episode as the claims required. (*Id.* at 125.)

The obviousness rejection was renewed in November 2019. (*See id.* at 180-203.) In response, the applicant amended the claims to require “separately” generating distraction events. It also added a limitation requiring that each event comprise “concurrent motion ... and interaction with the mobile device by an occupant of the vehicle.” (*Id.* at 223.) Applicant then reiterated its prior argument, noting that both Neitzel and Cordova teach only detecting “a single instance” of distraction, not multiple such instances forming an episode. (*Id.* at 228-229.) After this, the claims were allowed. (*See id.* at 248-256; *see also* Ex. 1003, ¶¶ 132-143.)

VI. Claim Construction

The Board applies the same *Phillips* claim construction standard used by district courts. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*). For purposes of this petition, Petitioner submits that the terms of the ’249 patent’s claims do not require further construction and can be afforded their plain and ordinary meaning. (*See* Ex. 1003, ¶¶ 145-148.)

VII. Level of Ordinary Skill in the Art

A POSITA in the field of the ’249 patent would have had a degree in computer science, computer engineering, electrical engineering, or a similar discipline, along

with 2 years of professional experience working with the interplay of mobile devices and vehicles, or an equivalent level of skill, knowledge, and experience. (Ex. 1003, ¶¶ 145-148.) This POSITA would have been aware of and generally knowledgeable about mobile device operation and safety problems arising from mobile device use in a moving vehicle. (*See id.*, ¶ 148.)

VIII. Prior Art Overview

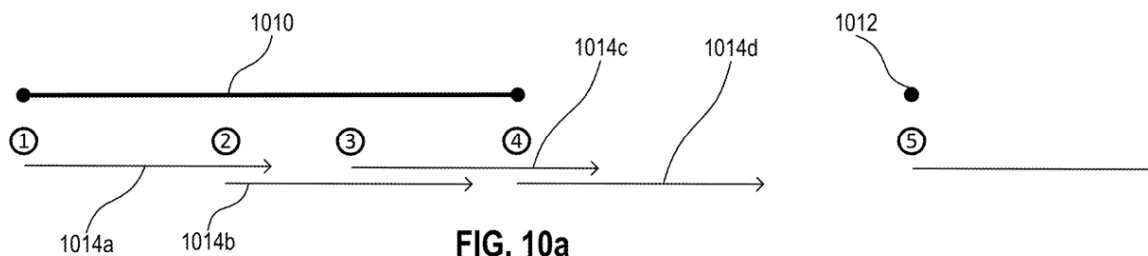
A. Schmitt

Schmitt issued February 18, 2020, and was filed March 26, 2018. (Ex. 1004, Cover.) It is prior art under AIA § 102(a)(2).

Schmitt relates to a “mobile device movement detection” and “distracted driving analysis system....” (Ex. 1004, 4:54-56; *see also id.*, 1:25-30.) The system receives signals from a variety of “mobile device sensors 214” including “an accelerometer 216, a GPS receiver 218, a gyroscope 220, a microphone 222, a camera 224, and a magnetometer 226.” (*Id.*, 9:1-4; Fig. 2.) The GPS sensor allows the system to “determine whether a trip associated with the vehicle has started.” (*Id.*, 19:43-45, 49-51; *see also* Fig. 7.) Then, if the mobile device is on a trip, the other sensors can be used to detect “device usage event[s] and/or ... device movement event[s].” (Ex. 1004, 22:51-54; *see also id.*, 1:25-27; 1:63-65; 2:40-42.)

Schmitt’s system uses the detected usage/movement events to determine if a distraction “session” occurred. (*See id.*, 2:1-9, 2:40-42.) A “session” entails “a

plurality of events associated with the mobile device” that “occur[] within a respective threshold amount of time...” (*Id.*, 2:48-55.) Figure 10a shows this:



(*Id.*, Fig. 10a.) Events 1-4 form a “session” with a “duration 1010 based on the session start time and the session end time...” (*Id.*, 25:25-29.)

Schmitt’s system also assesses identified distractions for purposes of “calculate[ing] a risk score based on the movement of [the] mobile device.” (Ex. 1004, 1:35-43; *see also id.*, 4:62-5:6; 8:3-13; 14:63-66; Fig. 4.) A “higher score” can be assigned to distractions that represent a greater risk, and “lower score” to less serious distractions. (*See id.*, 17:64-18:10.) The score takes into “the intensity of phone movement” or the “frequency of mobile device movement events...” (*Id.*, 17:54-63.) If the risk score crosses a threshold, the system can respond by providing a notification or even disabling of the device. (*See id.*, 18:65-19:26; *see also* Ex. 1003, ¶¶ 151-164.)

B. Olson

Olson issued October 24, 2017. (*See* Ex. 1005, Cover.) It is prior art under AIA § 102(a)(1).

Olson relates to “[s]ystems and/or methods ... for preventing a user of a user device ... from driving a vehicle ... while being distracted by the user device.” (Ex. 1005, 1:54-57; *see also id.*, Abstract.) Olson’s system first “determine[s] whether the user is actually driving the car” via a “[p]osition tracking system 240” like a “GPS system....” (*Id.*, 2:23-26; 4:39-48.) Then, it determines if “usage instances” occurred by “collect[ing] usage data while the user drives the vehicle.” (*Id.*, 2:37-43.) This data includes accelerometer data tracking device “orientation” changes, “image data of the user viewing the display,” “monitor[ed] inputs/outputs,” or “track[ed] internal processes executed by the user device” such as telephone calls or text messages. (*Id.*)

Next, Olson’s system “determine[s] whether a user is distracted” by keeping track of whether a “threshold” number of usage instances occurred within a “pre-selected time interval.” (*Id.*, 13:1-3, 13:39-53; Fig. 3.) Figure 11 provides an example. Here, the device has detected a series of related “operations 1110-1150 along timeline 1160” for purposes of “determin[ing] whether ... the user of user device 210 is distracted....” (*Id.*, 11:21-46.)

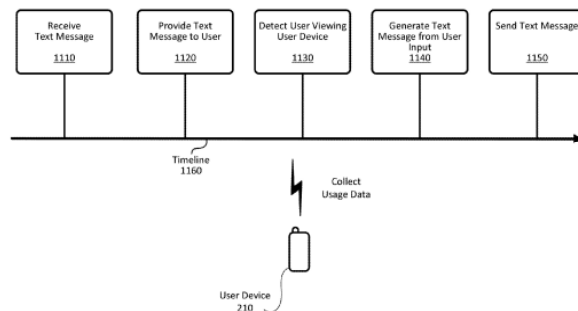


Fig. 11

(*Id.*, Fig. 11.)

Olson’s system is also able to distinguish distraction episodes that are “merely ... suspicious” from those that are “certain.” (*Id.*, 12:38-44.) To do this, “user device 210 may define distraction thresholds for different levels of confidence with respect to the user being distracted.” (*Id.*, 12:38-44.) A “suspicious” distraction can generate a different response than a “certain” distraction. (*Id.*, 12:48-56; *see also* Ex. 1003, ¶¶ 165-176.)

IX. Ground 1: Claims 1-10 Are Obvious Over Schmitt

Schmitt (Ex. 1004), when considered in view of the knowledge of a POSITA, renders claims 1-10 obvious.

Like the ’249 patent, Schmitt teaches a system that detects whether a driver is distracted by a mobile device. The system considers not only individual “events,” but “sessions” including multiple events. It also distinguishes between more and less risky sessions.

A. Claim-By-Claim Analysis

1. Claim 1

[1-a] “1. A method comprising receiving signals from one or more detectors of a mobile device while the mobile device is on a trip in a vehicle,”

Schmitt relates to a “mobile device movement detection system 101 in a distracted driving analysis system 100....” (Ex. 1004, 4:54-56; *see also id.*, 1:25-30.) The system “[d]etect[s] likely movement of a mobile device within a vehicle” for purposes of “reduc[ing] distracted driving and promot[ing] safety.” (*Id.*, 1:35-37.)

Schmitt’s system can be used with a variety of “**mobile device[s]**,” including “a smartphone, tablet computing device, personal digital assistant (PDA), smart watch, netbook, laptop computer, and other like devices found within a vehicle 204.” (*Id.*, 8:60-64; *see also id.*, 4:62-5:1; Ex. 1003, ¶¶ 180-184.)

Next, the system “**receiv[es] signals form one or more detectors of a mobile device**” while the device “**is on a trip in the vehicle.**” In particular, according to Schmitt, “mobile device 212 includes a set of mobile device sensors 214” including “an accelerometer 216, a GPS receiver 218, a gyroscope 220, a microphone 222, a camera 224, and a magnetometer 226.” (Ex. 1004, 9:1-4; *see also id.*, 9:15-25.) These sensors operate to “detect[] and record[] various conditions at the mobile device 112....” (*Id.*, 9:4-6.) Data is collected from the sensors while the device is on a vehicle “trip.” (*See id.*, 19:43-20:11 (explaining that Schmitt detects

“movement of the device” after it determines that “a trip has started”); Fig. 7 (similar).) The “[d]ata collected by the mobile device sensors 214” is “stored, processed, and/or analyzed within the mobile device 212....” (*Id.*, 9:44-50.) These signal-generating sensors 214 are shown in Figure 2:

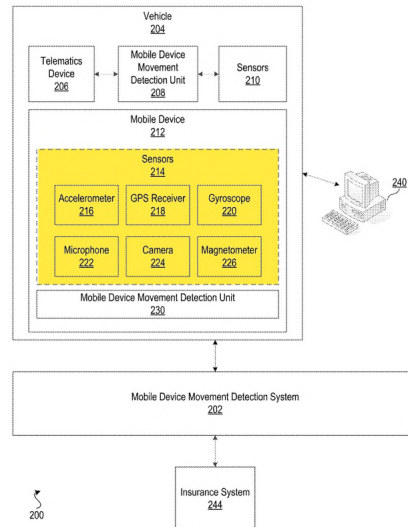


FIG. 2

(*Id.*, Fig. 2 (annotated); see also Ex. 1003, ¶¶ 185-189.)

[1-b] “using the received signals from the one or more detectors to identify one or more physical states of the mobile device during the trip, the one or more physical states comprising motion of the mobile device along a trajectory of the trip,”

Schmitt identifies “*physical states of the mobile device during the trip*” “*using the received*” detector “*signals.*” Again, Schmitt uses its sensors 214 to detect device states such as movement and usage. (*E.g.*, Ex. 1004, Abstract, 1:27-30, 1:63-66, 2:40-42, 12:54-64, 20:8-11, 22:51-54.) Device movement/usage is detected while the device is on a trip. (See, *e.g.*, *id.*, 19:43-20:11; Fig. 7.)

Schmitt also explains that the “mobile device ... may determine whether a trip associated with the vehicle has started.” (Ex. 1004, 19:43-45, 49-51.) One of Schmitt’s mobile device sensors 214 is a “GPS receiver 218.” (*Id.*, 9:1-4; Fig. 2). Data from this GPS receiver is used to determine if the device is moving along with a vehicle. (*See id.*) In particular, the data allows Schmitt to determine “a distance the vehicle has traveled from a prior trip end location” (*i.e.*, whether the device has moved far enough to indicate a trip), or whether “the vehicle travels over a threshold speed ... for a threshold amount of time” (*i.e.*, whether the device has moved fast enough for long enough to indicate a trip). (*Id.*, 19:51-56; *see also* Fig. 7.) Thus, Schmitt also uses “*received signals from the one or more detectors*” (the GPS receiver signals) “*to identify*” a “*physical state[] comprising motion of the mobile device along a trajectory of the trip*” (whether the device has moved sufficiently or fast enough such that it can be considered to be in a vehicle on a trip). (Ex. 1003, ¶¶ 190-195.)

[1-c] “based on the identified one or more physical states, separately generating two or more discrete distraction events separated in time, each of the discrete distraction events comprising concurrent motion of the mobile device and interaction with the mobile device by an occupant of the vehicle, and”

Next, Schmitt’s system performs a series of distracted driving detection steps “*based on the identified one or more physical states.*” Again, Schmitt uses sensor data to detect device movement both along with and within a vehicle. (*See supra* Section IX.A.1.[1-b].) Further, according to Schmitt, “FIG. 7 is a flowchart 700 of

example steps for determining device movement....” (Ex. 1004, 19:43-45.) The process begins at “step 708.” If the mobile “device ... determine[s] that a trip associated with the vehicle has started” “(step 708: Y)” then it “proceed to step 710” and conducts additional analysis. (*Id.*, 19:49-64.)

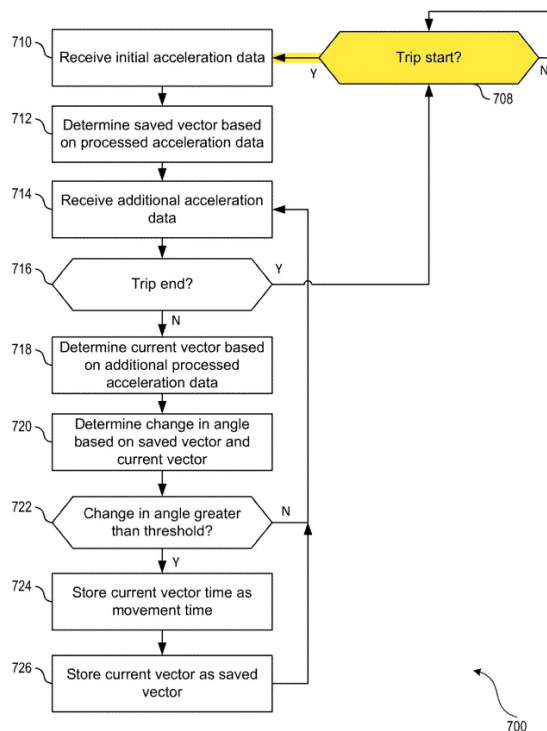
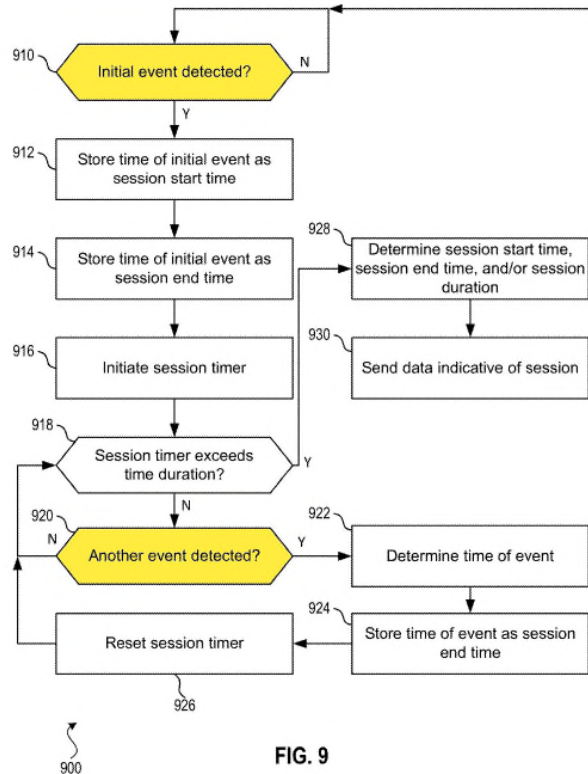


FIG. 7

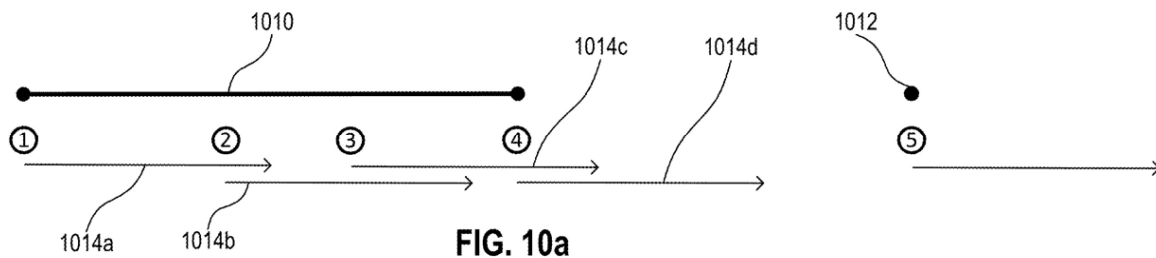
(*Id.*, Fig. 7 (annotated).) As shown in the annotated version of Figure 7 above, step 710 and the other steps that follow occur only if “Trip start?” step 708 is satisfied. (*See id.*; *see also id.*, 19:65-20:11.) Thus, these subsequent steps—including the later determination of device movement indicative of usage (*see id.*, 20:9-11, 22:61-64)—are “**based**” not only the sensor and other data Schmitt collects, but also on Schmitt’s determination that the device is moving along with a vehicle on a trip. (*See Ex. 1003*, ¶¶ 196-202.)

Schmitt's system also teaches ***“separately generating two or more discrete distraction events separated in time.”*** The system operates to detect mobile “device usage event[s] and/or ... device movement event[s].” (Ex. 1004, 22:51-54; *see also id.*, 1:25-27 (Schmitt “relate[s] to the analysis of accelerometer data and/or device usage data obtained from a device within a vehicle”); 1:63-65; 2:40-42.) The system collects a “plurality” of such movement/usage events, and is able to assess whether a particular “event ... occurs within a respective threshold amount of time from a prior event.” (*Id.*, 2:48-53.)

Figure 9, which depicts “steps for determining instantaneous events and/or continuous events,” provides an example. (*Id.*, 22:44-46.) In step 910, “an initial event” is detected. (*Id.*, 22:51-52.) Then, at later step 920, “the device may determine whether another event has been detected....” (*Id.*, 24:11-12.) After “event 2 is detected,” the process may repeat determining whether “another event (event 3) occurred” and so on. (*Id.*, 23:53-58.) The below annotations show the detection of an “[i]nitial event” and the later detection of “[a]nother event”:



(*Id.*, Fig. 9 (annotated).) Figure 10a provides yet another example. A series events—“event 1, event 2, event 3, ... event 4” and “event 5”—were detected separately at different times:



(*Id.*, Fig. 10a, 24:21-23, 24:56-58, 25:1-5, 26:35-38; *see also* Ex. 1003, ¶¶ 203-211.)

Schmitt also teaches a system in which ***“each of the discrete distraction events compris[es] concurrent motion of the mobile device and interaction with***

the mobile device by an occupant of the vehicle.” To begin, Schmitt monitors for both device movement and usage: Schmitt’s system recognizes “indications of distracted driving, such as mobile device movement (e.g., orientation changes) within the vehicle and/or mobile device usage within the vehicle.” (Ex. 1004, 19:36-42.)

To detect a “mobile device movement event,” “sensor data collected from the mobile sensors 214” is analyzed “determine whether there is a threshold change in the direction of the acceleration of the mobile device 212.” (*Id.*, 12:54-64.) This can include “mobile device movement (e.g., orientation changes) within the vehicle....” (*Id.*, 19:36-39; *see also id.*, 26:23-25 (explaining that a “device movement event” can entail “a change in vector angles exceeding a threshold”).)

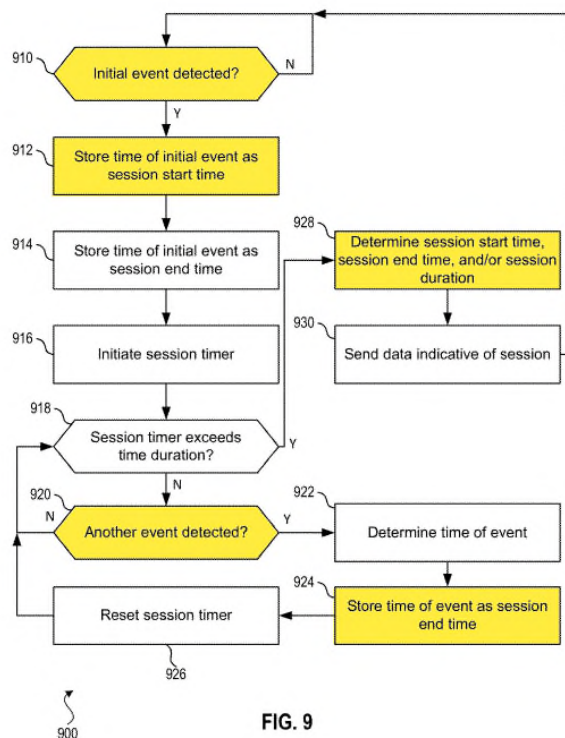
With respect to device usage, the system “monitor[s] ... for ... the user locking the mobile device, unlocking the mobile device, using an application of the mobile device (e.g., a texting application, an email application, a game application, etc.), or otherwise using the mobile device.” (*Id.*, 22:30-36.) “The mobile device ... may receive indications of mobile device usage from an operating system of the mobile device.” (*Id.*, 22:36-38.) “For example, on an ANDROID device, device usage may be recorded each time an ACTION_USER_PRESENT event is recorded from the operating system.” (*Id.*, 22:38-41.) Similarly, “[o]n an iOS device, device

usage may be recorded each time a data not protected event is recorded....” (*Id.*, 22:41-43; *see also* Ex. 1003, ¶¶ 212-217.)

In Schmitt’s system, “***each of the discrete distraction events***” the system detects can entail “***concurrent motion ... and interaction with the mobile device.***” Here, Schmitt explains that its system can be configured such that each device usage “event” entails both mobile device movement relative to the vehicle and device usage: “[A]n initial event may be detected if a pair of device usage and device movement events is identified.” (Ex. 1004, 22:63-65 (emphasis added); *see also id.*, 23:5-7 (“[t]he device may detect an initial event (e.g., step 910: Y)” only “if a pair of usage and device movement events is detected.”) (emphasis added); 26:10-15 (explaining that the “event detected by the device may comprise a device usage event (e.g., device unlock, device lock, application usage, etc.) and/or a device movement event (e.g., a change in vector angles exceeding a threshold change in angles”) (emphasis added).) Schmitt elaborates by explaining that “[a] device usage event and a device movement event may occur at the same time....” (*Id.*, 22:65-23:5 (emphasis added).) Moreover, Schmitt does not limit this to just an “initial event.” It repeatedly explains that every detected event can involve both “phone movement” and “usage events.” (*Id.*, 19:39-42; *see also id.*, 1:25-27; *see also* Ex. 1003, ¶¶ 218-226.)

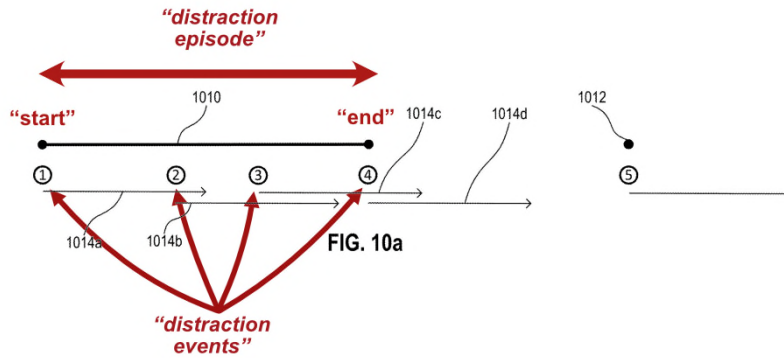
[1-d(1)] “determining a distraction episode that extends from a start to an end of an interval and encompasses two or more of the discrete distraction events occurring in the interval and during the trip in the vehicle,”

In addition to detecting individual mobile device “usage event[s],” Schmitt explains that its system determines if “an event session” has occurred. (Ex. 1004, 2:1-9, 2:40-42.) An “event session” entails “a plurality of events associated with the mobile device” that “occur[] within a respective threshold amount of time....” (*Id.*, 2:48-55.) The system not only determines that such a “session” occurred, but also determines “the start time of the event session, an end time of the event session, and/or a duration of the event session.” (*Id.*, 2:58-62.) Schmitt depicts this in Figure 9. The “session start time” and “session end time” are both “[d]etermine[d]” at step 928. At least an “[i]nitial event” and “[a]nother event” can be detected during a “session.” The time when an “initial event” occurred is “session start time” (step 912), while the time when the last “event” occurred is the “session end time” (step 924):



(*Id.*, Fig. 9 (annotated).)

Figure 10a provides yet another example. Here, a “session” with a “duration 1010 based to the session start time and ... end time” has been detected. (*Id.*, 25:25-29.) The session is composed of “four events (e.g., event 1, event 2, event 3, and event 4)” each of which occurred within a particular “time duration” 1014a, b, or c of the preceding event to form a “continuous event.” (*Id.*, 25:1-5.) Again, these events all occur while the device is in a vehicle on a trip. (*See id.*, 19:49-20:11; Fig. 7.)



(*Id.*, Fig. 10(a) (annotated).) As shown, the session with duration 1010 constitutes a **“distraction episode”** with a **“start”** (event 1) and an **“end”** (event 4) spanning an **“interval”** (duration 1010) that occurred during a **“trip in the vehicle.”** Further this episode includes multiple **“discrete distraction events”** (events 1-4). (See Ex. 1003, ¶¶ 227-239.)

[1-d(2)] “the determining of the distraction episode comprising determining a possible distraction episode and after the possible distraction episode is determined, determining that the possible distraction episode comprises a true distraction episode.”

Schmitt’s system not only detects distraction, but also performs a second level of analysis: it “calculate[s] a risk score based on the movement of [the] mobile device.” (Ex. 1004, 1:35-43; *see also id.*, 4:62-5:6 (explaining that Schmitt’s system first “detect[s] mobile device movement events” and then “determin[es] a risk score”); 8:3-13; 14:63-66; Fig. 4.) This “risk score” is calculated from “aggregated sensor data” and can be “based on a plurality of factors.” (*Id.*, 8:3-13; 17:46-54; *see also id.*, 18:11-30 (providing examples of “risk calculation equation[s]” considering numerous factors 1-n).) This can include the “frequency of mobile device movement

events....” (*Id.*, 17:54-63.) Schmitt explains that its system can assign a “higher score” to distractions that represent a greater risk, and “lower score” to less serious distractions. (*See id.*, 17:64-18:10; *see also* Ex. 1003, ¶¶ 240-244.)

The calculated “risk score” is used to determine the type of response provided to a given distraction. (*See* Ex. 1004, 12:52-54; *see also id.*, 13:1-4 (“The mobile device movement detection units ... may then generate and provide feedback to the mobile device 212 or vehicle 204 based on the calculated risk score.”); 18:42-44 (similar).) The system “may recommend providing feedback” to the device user only if the “calculated risk score is above a predetermined threshold.” (*Id.*, 18:44-47.) Different responses can be provided for different levels of risk. A “more passive notification” can be provided if the risk score is lower, while an “alarm” “may issue” or the device may be disabled if the risk score is higher. (*Id.*, 18:65-19:26; *see also* Ex. 1003, ¶¶ 245-247.)

A POSITA would have understood this to teach what this limitation requires. (*See* Ex. 1003, ¶¶ 248-261.) Schmitt’s system first determines that a “**possible distraction episode**” occurred (the initially detected distraction “session”). (*See id.*, ¶ 249.) And, it then separately determines that this is a “**true distraction episode**” (by applying a high risk score that crosses a predetermined threshold to the “session”). (*See id.*, ¶ 250.) A POSITA would have considered these threshold-crossing higher risk score distractions to be analogous to the claimed “**true**”

distractions. (See *id.*, ¶¶ 251-256.) Again, per Schmitt, higher risk scores are assigned to sessions entailing more intense and more frequent device usage. (See Ex. 1004, 17:54-63.) A POSITA would have understood that detected sessions involving more intense and more frequent device usage and movement are far more likely to represent distraction and thus be **“true.”** (See Ex. 1003, ¶¶ 71-74, 79-101, 256; *see also* Ex. 1010, Figs. 2-3 (showing that more complex tasks take more time, and longer distractions are more likely to lead to crashes).) Similarly, Schmitt explains that if risk score is sufficiently high such that it crosses a threshold, the system can respond. (*E.g.*, Ex. 1004, 18:44-47.) A POSITA would also have understood that a distraction that is so risky that a response is required also represents a more certain and **“true”** distraction. (See Ex. 1003, ¶¶ 246, 251-252.)

Moreover, Schmitt makes this **“true distraction episode”** determination **“after”** it has determined that there is a **“possible distraction episode.”** Schmitt calculates its risk score using aggregated sensor data and takes into account, among other things, movement frequency. (See *supra* discussion.) Because this aggregated sensor data and frequency information is not available until a session ends, a POSITA would have understood that the score is (or at the very least obviously could be) determined and calculated **“after”** the conclusion of a distraction session. (See Ex. 1003, ¶¶ 257-261 ; *see also* Ex. 1008, 7:64-66 (explaining that in the prior art, a score or grade is “generated” after an “estimate” of distraction “is completed”).)

2. Claim 2

Claim 2 depends on claim 1 and further requires:

“the one or more physical states comprises an operational state of the mobile device”

Schmitt’s system detects a variety of mobile “device usage event[s].” (Ex. 1004, 22:51-54; *see also id.*, 1:25-27; 2:40-42.) This includes the locking/unlocking of the device, application use, or any other event that results in the generation of an operating system message reflecting user interaction with the device. (*See id.*, 22:30-43.) These all relate to **“an operational state of the mobile device.”** (*See* Ex. 1003, ¶¶ 262-266.)

3. Claim 3

Claim 3 depends on claim 2 and further requires that:

“the operational state comprises a state of locking of the mobile device”

Schmitt explains that “the mobile device usage event” detected by its system “may comprise ... a mobile device unlock or a mobile device lock.” (Ex. 1004, 2:46-47; *see also id.*, 26:10-15; Ex. 1003, ¶¶ 267-269.)

4. Claim 4

Claim 4 depends on claim 3 and further requires that:

“the operational state comprises a state of a phone call”

Schmitt’s system monitors for any type of mobile device usage indicative of distraction. (*See* Ex. 1004, 22:30-43.) A POSITA would have known and

considered it highly obvious that “initiating a telephone call” via a device telephone application is one type of usage that indicates distraction and thus should be collected by Schmitt’s system. (*E.g.*, Ex. 1005, 9:25-29; *see also* Ex. 1003, ¶¶ 270-274.) Indeed, Schmitt itself explains that its system is able to detect and consider “phone ... usage within the vehicle.” (Ex. 1004, 10:29-37.)

5. Claim 5

Claim 5 depends on claim 4 and further requires that:

“the operational state comprises a power condition”

Schmitt’s system monitors for “indications of mobile device usage from an operating system” such as “an ACTION_USER_PRESENT” event. (*See* Ex. 1004, 22:36-41.) This type of event is generated by an operating system when the device is “powered up” and “the user has cleared the first authentication, and is now able to interact with the” device. (Ex. 1006, 4:41-5:10.) Thus, Schmitt’s system monitors for **“a power condition”** (*i.e.*, the device is on, awake, available to the user, and generating events). (*See* Ex. 1003, ¶¶ 275-280.)

6. Claim 6

Claim 6 depends on claim 4 and further requires that:

“the operational state comprises an aspect of a foreground app running on the mobile device”

Schmitt’s system monitors for a user “using an application of the mobile device (e.g., a texting application, an email application, a game application, etc.).”

(Ex. 1004, 22:30-36; *see also id.*, 26:10-15 (explaining that a “device usage event” can entail “application usage”).) Active, ongoing application use is an example of **“an aspect of a foreground app running on the mobile device.”** (See Ex. 1003, ¶¶ 281-284.)

7. Claim 7

Claim 7 depends on claim 1 and further requires that:

“determining a distraction episode comprises determining that a physical state of the mobile device comprises no interaction by a user or that accelerometer or gyroscope values are lower than a threshold that differs from a threshold used in determining motion of the mobile device at the start of the distraction episode”

Schmitt’s system detects not only discrete events, but also “event session[s]” where “a plurality of events associated with the mobile device” “occur[] within a respective threshold amount of time....” (Ex. 1004, 2:1-9, 2:40-42; 2:48-55.) This “event session” corresponds to the claimed **“distraction episode.”** (See *supra* discussion of limitation [1-d(1)].) Moreover, Schmitt determines the “end time of an event session.” (Ex. 1004, 2:58-62.) To do so, Schmitt “initiate[s] a session timer.” (*Id.*, 23:31-35.) Then, “if the device does not detect another event within a threshold amount of time from the prior event (e.g., the initial event or another event), the device may end the session....” (*Id.*, 23:34-40; *see also id.*, 25:12-21; Figs. 9, 10a.) Because Schmitt monitors for the cessation of device movement and

usage events, it determines ***“a physical state of the mobile device comprises no interaction by a user.”*** (See Ex. 1003, ¶¶ 285-291.)

8. Claim 8

Claim 8 depends on claim 7 and further requires that:

“the end of the distraction episode is not determined until after a refractory period of no further movement of the mobile device or no indication of a continued distraction”

This is taught by Schmitt for the same reasons discussed for claim 7: Schmitt determines that a ***“distraction episode”*** (its “event session”) has ended after a ***“refractory period of no further movement”*** or ***“no indication of ... continued distraction”*** (when “the device does not detect another event within a threshold amount of time from a prior event”). (Ex. 1004, 23:34-40; 25:12-21; Figs. 9, 10a; see also Ex. 1003, ¶¶ 292-295.)

9. Claim 9

Claim 9 depends on claim 8 and further requires that:

“determining an end of the distraction episode comprises determining that a context of the mobile device indicates no further distraction”

In the '249 patent, “contextual information” used to determine driver distraction “broadly ... includes ... one or more circumstances or conditions associated with a distraction episode.” (Ex. 1001, 4:4-6.) For example, “distraction context” can include “the start and end locations of the trip,” the session of inputs like “phone tapping,” whether a device is mounted or held, a “phone call state,” or

the “phone’s orientation and operational states.” (Ex. 1001, 2:30-34, 8:10-17; 11:52-54, 12:62-13:24.)

Schmitt’s system monitors for, detects, and considers the same **“context of the mobile device”** when making distraction determinations. Schmitt monitors for whether a “trip associated with the vehicle has started” or “ended.” (Ex. 1004, 19:49-51, 20:49-51; Fig. 7.) If the trip ends, Schmitt discontinues monitoring for device movement or usage. (See *id.*; see also *id.*, 22:20-43, 24:6-10; Figs. 7, 9.) Further, Schmitt can determine if “mobile device movement occurs during safer driving conditions (e.g., non-peak traffic, high visibility, below average speed of the vehicle, etc.)” and respond differently if this is the case. (See *id.*, 19:17-26.) Schmitt also monitors for various indications of device “usage” (or the absence thereof) like movement, orientation changes, and operational state. (See Ex. 1004, 1:25-27; 2:40-42; 22:51-54; Fig. 9.) All of this—including the end of a trip, safe driving, or the absence of usage—is contextual information indicating **“no further distraction.”** (See Ex. 1003, ¶¶ 296-304.)

10. Claim 10

Claim 10 depends on claim 9 and further requires that:

“determining that the possible distraction episode comprises a true distraction episode includes determining that a time period spanned by the possible distraction episode is longer than a predetermined length”

Schmitt’s system distinguishes between “higher” and “lower” risk distractions. (See Ex. 1004, 17:64-18:1-10.) Various “factors” collected by Schmitt’s system can be used “to calculate a risk score.” (*Id.*, 19:8-10.) One of the collected factors is the distraction “session duration.” (*Id.*, 25:20-29.) Schmitt provides examples with both a longer “session duration 1010” including more events (Fig. 10a) and a shorter “session duration 1022” including fewer events (Fig. 10b). (See also *id.*, 25:25-29; 26:32-45.) Likewise, it is able to consider whether “mobile device movement events are frequent (e.g., above a threshold amount of mobile device movement events detected...)[.]” (*Id.*, 19:10-14.)

These teachings render this claim obvious. As explained, per Schmitt the duration of a distraction session can be recorded and used in assessing risk. A POSITA would have considered it highly obvious that distraction sessions extending over a “**time period**” that is “**longer**” as this claim requires should—or at the very least obviously could—result in both a higher risk score and a higher degree of distraction certainty. (See Ex. 1003, ¶¶ 79-101, 306-323; see also Ex. 1010, Fig. 3 (showing that longer periods of distraction create a higher risk of accident).) A POSITA would have understood that a longer distraction session likely entails a greater number of distraction events, and a corresponding increase in the time in

which the driver is diverted from focusing on safe driving. (See, e.g., Ex. 1008, 32:66-33:4 (explaining that use of a device “for a long time” is indicative of “potentially dangerous vehicle (or portable device) operation”); see also Ex. 1003, ¶¶ 91, 101, 321-323.) This in turn makes the distraction more serious and more likely to be a “*true distraction episode*” as this claim requires. (See *id.*, ¶ 323.)

B. Motivation to Combine

A POSITA would have considered it obvious and would have been motivated to apply and combine the various teachings of Schmitt in the manner discussed above. (See Ex. 1003, ¶¶ 324-347.)

First, a POSITA would have been motivated to implement Schmitt’s system such that it simultaneously or concurrently considers both device motion and interaction data when determining whether a “usage instance” has occurred. (See Ex. 1003, ¶ 325.) Schmitt itself already contemplates and teaches that its system can detect and consider a “device usage event” and “device movement event” that “occur at the same time.” (Ex. 1004, 22:65-23:5; see also *id.*, 23:5-7; 26:10-15.) Thus, a POSITA would consider the concurrent use of motion and usage data to be nothing more than one of the multiple different design choices Schmitt already presents. (See Ex. 1003, ¶¶ 326-327.)

It was also known in the prior art that considering usage along with movement “may better enable” a mobile device “to determine whether the user is distracted....”

(*E.g.*, Ex. 1005, 10:23-25.) A POSITA would have understood that collectively considering both motion and usage data would similarly improve the accuracy of and optimize Schmitt's system. (*See* Ex. 1003, ¶¶ 328-330.) By considering both usage and motion, meaningful events could be more readily distinguished from less meaningful events. (*See id.*, ¶ 331.) This would have further motivated use of both types of data when determining whether a device usage event occurred. (*See id.*, ¶ 332.)

Second, a POSITA would have been motivated to implement Schmitt's system such that high risk scores are assigned to (and differentiate) "true" distractions from distractions that are less problematic. (*See id.*, ¶¶ 333-341.) Schmitt explains that its system may cause the phone and/or vehicle to "provid[e] feedback" if a "calculated risk score" is high enough to be "above a predetermined threshold." (Ex. 1004, 18:44-47.) Certain types of feedback contemplated by Schmitt are relatively non-invasive—such as "passive" "notification or warning"—others are more extreme. (*Id.*, 18:47-55, 19:17-26.) Other feedback, however, is more extreme. For instance, Schmitt's system may "issue an alarm" or "disable the user interface of the mobile device." (*Id.*, 19:7-17.) This would have motivated a POSITA to employ a risk score (or score threshold) indicating that distraction occurred with a high level of certainty. (*See* Ex. 1003, ¶¶ 334-337.) This would allow the more extreme feedback to be employed only in situations where it is truly

needed. (*See id.*, ¶¶ 338-339.) It would also result in increased user confidence in the system. Because there would be a greater certainty of distraction, users would be more likely to agree with (and less likely to dispute) a decision to issue feedback. (*See id.*, ¶¶ 340-341.)

A POSITA would also have considered designing Schmitt's risk scores such that they are able to distinguish "possible" from "true" distractions to amount to nothing more than a routine design choice and an exercise in straightforward optimization. Schmitt already allows for different "risk calculation equations" using "different factors with different assigned scores and/or weights." (Ex. 1004, 18:11-37.) And, the system is already intended to identify "more dangerous driving conditions." (*Id.*, 19:7-10.) A POSITA would have been readily able to tailor Schmitt's existing risk scores (or any threshold to which these scores are compared) to facilitate identification of not just risky distractions, but also "true" distractions as the '249 patent's claims require. (*See* Ex. 1003, ¶¶ 91, 341-347.) "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *E.I. DuPont De Nemours & Co. v. Synvina Cv.* 904 F.3d 996, 1006 (Fed. Cir. 2018) (citing *In re Aller*, 220 F.2d 454, 456 (CCPA 1955).) This is all the '249 patent's requirement that a "true" distraction be identified does here.

A POSITA would also have had a more than reasonable expectation of success. (See Ex. 1003, ¶¶ 348-352.) As explained, Schmitt’s system is already open to the collection and use of both motion and usage data. (See, e.g., Ex. 1004, 22:63-23:7.) Further, Schmitt explains that its risk scores can be calculated in a variety of ways. (*Id.*, 18:33-37.) A POSITA would consider use of multiple types of data simultaneously, and the use of the risk scores to differentiate merely “possible” from “true” distractions, to be nothing more than straightforward variations on what Olson already teaches. (See Ex. 1003, ¶¶ 349-351.) Given this, a POSITA would have every reason to believe—and no reason to doubt—that Schmitt’s system could be designed to include these features and operations. (See *Id.*, ¶ 352.)

X. Ground 2: Claims 1-10 Are Obvious Over Schmitt and Olson

Even if it is determined that Schmitt does not itself render claims 1-10 obvious, these claims would still be obvious when Schmitt is considered in view of the teachings of Olson (Ex. 1005).

A. Olson Supplements Schmitt by Teaching a System that Identifies “True” Distractions

Again, Schmitt’s system distinguishes between different types of distractions and assigns a risk score. (See *supra* Sections IX.A.1.[1-d(2)], IX.B.) As explained above, a POSITA would have considered it obvious to tailor these risk scores such

that they are able to differentiate between “***distraction episode[s]***” that are merely “***possible***” from those that are “***true.***” (See *id.*)

Patent Owner may argue that the claimed determination of a “***true***” distraction episode requires absolute certainty (and not just a high risk) that distraction has occurred. Petitioner submits that Schmitt renders even this obvious. (See *supra* Section IX.B.) But, even if it did not, Olson teaches a system that makes this very determination.

Olson, like Schmitt, relates to a “[s]ystem[] ... for preventing a user of a user device ... from driving a vehicle ... while being distracted by the user device.” (Ex. 1005, 1:54-57; see also *id.*, Abstract.) To do so, Olson “collect[s] usage data” from a user’s mobile device “while the user drives the vehicle.” (Ex. 1005, 2:37-38; see also *id.*, 3:4-7; 6:60-64; 8:36-38.) This device usage data can include “any type of input/output” or “change[s] in orientation.” (*Id.*, 9:1-11.)

Also, like Schmitt, Olson monitors the occurrence of device usage over time to determine distraction. Olson’s system assesses detected “usage instances....” (*Id.*, 13:1-16.) “[A] single usage instance may include a single type of usage data, such as the user viewing a display ..., the user accessing an application ..., a user inputting information ..., etc.” (*Id.*, 13:12-16.) Accumulation of “usage instances” over a given “time interval” indicate distraction. (*Id.*, 13:7-10, 13:39-53.)

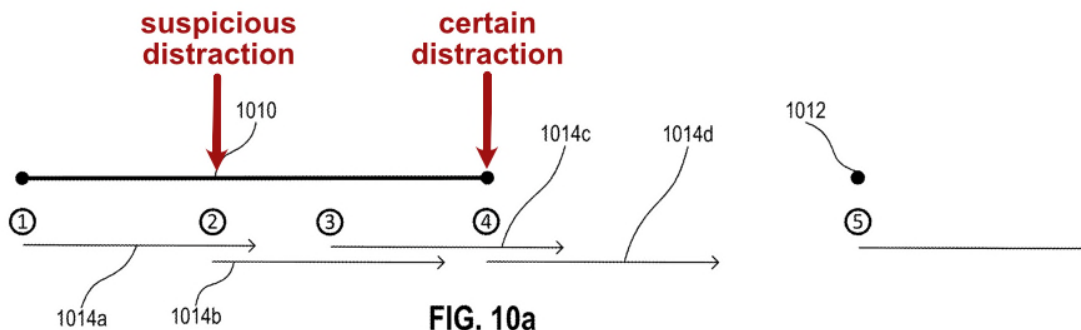
Not only does Olson's system operate to detect distractions, but it also distinguishes distraction episodes that are "merely ... suspicious" from those that are "certain." (*Id.*, 12:38-44.) To accomplish this, "distraction thresholds" are defined "for different levels of confidence with respect to the user being distracted. For instance, user device 210 may define a distraction threshold that corresponds to merely being suspicious that a user is distracted and another distraction threshold for being certain that the user is distracted." (*Id.*, 12:38-44.) This allows for different responses depending on the "level of confidence regarding the user actually being distracted." (*Id.*, 12:45-60; *see also* Ex. 1003, ¶¶ 359-366.)

One straightforward and obvious way a POSITA would have accomplished this would have been to employ a lower threshold for "suspicious" distractions, and a higher threshold for "certain" distractions. (*See* Ex. 1003, ¶¶ 72, 74, 91, 101, 367-369 (explaining that more and longer distraction increases accident risk).) In other words, fewer usage instances would give rise to a "suspicious" distraction," while more usage instances would result in a "certain" distraction." (*See id.*; *see also* Ex. 1008, 32:66-33:4 (noting that an "operator ... viewing [a] portable device for a long time" indicates "potentially dangerous vehicle (or portable device) operation").) Olson explains that its system is designed to operate in this way: it "may ... respond to a usage data analysis" indicating distraction "by continuing to collect usage data...." (Ex. 1005, 14:19-22; *see also id.*, 15:14-20 (explaining that the system

“continue[s] to monitor the movements of user device 210” after a distraction determination is made).) In such circumstances, as usage instances accumulate, the system would determine there to be a “suspicious” distraction when the first, lower threshold is crossed. (See Ex. 1003, ¶¶ 370-372.) It would then later determine there to be a “certain” distraction when the second, higher threshold is crossed. (See *id.*, ¶ 372.)

Applying Olson’s ability to distinguish “suspicious” from “certain” distractions using different thresholds to Schmitt results in the claimed subject matter. A shorter distraction session including a smaller number of distraction events would result in a determination that a “suspicious” distraction occurred, while longer ongoing distraction involving more distraction events would result in an upgrade of the previous “suspicious” determination to a “certain” distraction. As explained by Petitioner’s expert, it was well known in the art that longer periods of continuous distraction involving more distraction events are far more likely to represent a certain or true distraction and give rise to an accident. (See Ex. 1003, ¶¶ 71-74, 79-101, 372; *see also* Ex. 1010, Fig. 3 (showing that distraction episodes exceeding 1.5 seconds somewhat increase the risk of accident, while distraction episodes exceeding 2 seconds significantly increase accident risk).) By way of example, a threshold of two distraction instances could indicate a “suspicious” distraction, while four or more distraction instances would be needed for a “certain” distraction. Thus,

in the context of Figure 10a, a “suspicious” distraction would be determined to have occurred after event 2, while a “certain” distraction would later be determined to have occurred after event 4. The “suspicious” distraction spans a shorter time-period than the “certain” distraction:



(Ex. 1004, Fig. 10a (annotated).) Just as this limitation requires, the system would first determine a ***“possible distraction episode”*** (the initial “suspicious” distraction) and then determine ***“that the possible distraction episode comprises a true distraction episode”*** ***“after the possible distraction episode is determined”*** (the later “certain” distraction). (See Ex. 1003, ¶¶ 373-378.)

B. Motivation to Combine

A POSITA would have considered it obvious and would have been motivated to apply Olson’s teachings to Schmitt. (See Ex. 1003, ¶¶ 379-408.)

Schmitt explains that its system is intended to improve on the prior art by “provid[ing] accurate ... methods for detecting” driver distraction in a vehicle. (Ex. 1004, 1:38-43.) Further, the system distinguishes between different detected

distractions by “calculat[ing] a risk score.” (*See id.*; *see also id.*, 12:14-19.) Varying types of “feedback” can be provided to the “mobile device or vehicle based on the risk score.” (*Id.*) Lower risk scores are intended to generate more “passive” notifications while higher risk scores can result in “alarms” or even the “disable[ing of] the” mobile device. (*See id.*, 18:54-25.)

A POSITA would have recognized that applying Olson’s teachings—in particular its ability to distinguish “merely ... suspicious” from “certain” distractions via the use of different thresholds—would have furthered Schmitt’s stated goals. (*See* Ex. 1003, ¶¶ 380-386.)

Olson explains that by distinguishing “merely ... suspicious” from “certain” distractions, its system allows for better identification of situations where a driver is “actually being distracted.” (Ex. 1005, 12:40-45.) A POSITA would have recognized that this would have improved the accuracy of Schmitt’s system. (*See* Ex. 1003, ¶¶ 384-386.) By applying Olson’s teachings, Schmitt would likewise be better able to distinguish device movement/usage indicating driver distraction from that that does not. (*See* Ex. 1003, ¶ 385.) Situations likely to involve certain/true driver distraction could be identified and distinguished from other, less troubling situations. (*See id.*)

Olson also explains that its system allows for more “customize[d] responses to the user being distracted according to a level of confidence....” (Ex. 1005, 12:44-

60.) Less invasive responses, like an “audio message,” are provided when the “user device ... is merely suspicious of the user being distracted.” (*Id.*) Other, more significant responses like “disabl[ing] one or more features” of the device, vehicle braking, or even law enforcement notification are reserved for circumstances where the “user device ... is certain of the user being distracted.” (*Id.*, 12:48-60, 14:61-65.) Schmitt’s system is also already designed to provide different feedback to a device user. (*See* Ex. 1004, 18:54-25.) A POSITA would have recognized that applying Olson would have improved Schmitt by allowing more serious feedback—like device disabling—to be limited to situations where it is most merited. (*See* Ex. 1003, ¶¶ 388-393.) This would include, for instance, circumstances where driver distraction has been ongoing for longer resulting in more distraction events and more certain distraction. (*See id.*, ¶ 393.) In other words, Olson would have allowed Schmitt to better tailor feedback to the detected distraction. (*See id.*)

Similarly, a POSITA would also have recognized that use of Olson’s different thresholds to distinguish “merely ... suspicious” from “certain” distractions would have improved Schmitt by allowing it to provide escalating driver feedback. (*See* Ex. 1003, ¶¶ 394-398.) A smaller number of distraction instances spanning a shorter time could produce a less invasive response (like a passive notification). (*Id.*, ¶ 395.) Continued distraction with ongoing events spanning a longer time, however, could produce increasingly invasive responses like device disabling or vehicle braking.

(*See id.*, ¶ 396.) This would afford the driver with an opportunity to self-correct: the system would begin its response to distraction by providing only a notification and would intervene with more extreme responses only if the driver continued to be distracted despite the notification. (*See id.*, ¶¶ 397-398.)

A POSITA would also have considered application of Olson to Schmitt to be nothing more than a routine, simple, and highly obvious design choice. Schmitt already teaches a system that can limit feedback to circumstances where a “calculated risk score is above a predetermined threshold.” (Ex. 1004, 18:44-47.) It is also already able to track of whether “movement events are frequent (e.g., above a threshold amount...)[.]” (*Id.*, 19:7-14.) Olson’s system is a straightforward variation of this: it similarly employs thresholds to make distraction determinations. (*See* Ex. 1003, ¶¶ 399-402.) A POSITA would have recognized that application of Olson to Schmitt entails nothing more than performing additional, analogous calculations using the data Schmitt already collects. (*See id.*, ¶ 403)

Next, “when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious.” *KSR Int’l Co. v. Teleflex Inc.*, 550 US 398, 406 (2007). This is all the ’249 patent does here. (*See* Ex. 1003, ¶¶ 404-408.) Schmitt teaches a system that operates to detect mobile device movement/usage for purposes of reducing distracted driving and promoting

vehicle safety. (Ex. 1004, 1:25-30, 1:35-37, 4:54-56.) Olson has similar goals, but further allows for the distinguishing of “merely ... suspicious” and “certain” driver distractions. (See Ex. 1005, 1:54-57; 12:38-44.) The combined system of Schmitt and Olson would continue to exhibit these very same benefits and advantages. (Ex. 1003, ¶ 408.)

A POSITA would also have had a more than reasonable expectation of success. (See *id.*, ¶¶ 409-412.) Schmitt and Olson both teach systems that collect similar data for similar purposes. Both detect mobile device movement and usage and identify driver distraction. (See, *e.g.*, Ex. 1004, 1:25-37; Ex. 1005, Ex. 1005, 1:54-57; 2:37-38.) As explained, both also teach that thresholds can be used when making distraction determinations. (See Ex. 1004, 18:44-47, 19:7-14; Ex. 1005, 12:38-44.) Given this, a POSITA would have every reason to believe—and no reason to doubt—that Olson’s teachings could be successfully used with Schmitt. (See Ex. 1003, ¶ 412.)

XI. Ground 3: Claims 1-10 Are Obvious Over Olson

Olson (Ex. 1005) itself, when considered in view of the knowledge of a POSITA, also renders claims 1-10 obvious.

A. Claim-By-Claim Analysis

1. Claim 1

[1-a] “1. A method comprising receiving signals from one or more detectors of a mobile device while the mobile device is on a trip in a vehicle,”

As claim 1 requires, Olson teaches a method performed while a **“mobile device is on a trip in a vehicle.”** Olson relates to “[s]ystems and/or methods ... for preventing a user of a user device ... from driving a vehicle ... while being distracted by the user device.” (Ex. 1005, 1:54-57; *see also id.*, Abstract.) This “user device” may be a “mobile telephone,” “smartphone,” “tablet computer, etc.” (*Id.*, 1:55-56; 2:4-5; *see also id.*, 3:23-27; Ex. 1003, ¶¶ 416-419.)

Olson also employs **“detectors of a mobile device”** that generate **“signals”** during a **“trip in a vehicle.”** In Olson, information from a user device “may be gathered and analyzed to determine whether the user is distracted by the user device while driving....” (Ex. 1005, 1:58-62.) “The user device” can itself be “used to determine whether a user is actually driving” and “gather information about the user while the user is driving....” (*Id.*, 3:4-7.)

Olson provide numerous examples of signal generating detectors. The user device “may determine whether the user is actually driving the car” via an “integrated” “[p]osition tracking system 240” like a “GPS system” or a “system that performs cellular triangulation techniques[.]” (*Id.*, 2:23-26; 4:39-48.) The device can also “collect usage data while the user drives the vehicle.” (*Id.*, 2:37-38.) This

can include detecting the “orientation of the user device” using accelerometers, “capturing image data of the user viewing the display,” “monitor[ing] inputs/outputs,” or “track[ing] internal processes executed by the user device” like telephone calls or text messages. (*Id.*, 2:38-43; *see also id.*, 9:1-11; 9:19-42; 9:64-10:2; Figs. 8-10; Ex. 1003, ¶¶ 420-424.)

[1-b] “using the received signals from the one or more detectors to identify one or more physical states of the mobile device during the trip, the one or more physical states comprising motion of the mobile device along a trajectory of the trip,”

Olson’s system identifies “*physical states of the mobile device during the trip*” “*using the received*” detector “*signals.*” Again, Olson’s system employs various sensor signals to detect device usage and movement. (*See, e.g.*, Ex. 1005, 2:38-43; Figs. 8-10.) Further, in Olson a “position tracking system 240 to determine whether” the device is in a “vehicle [that] is moving.” (*Id.*, 3:30-42.) This “position tracking system” can be “integrated into the user device” and may be a “GPS system” or “a system that performs cellular triangulation techniques” for tracking “the geographical movements of user device 210.” (*Id.*, 4:39-47.) Thus, another “*physical state*” identified by Olson’s “*detectors*” (the device integrated GPS or cellular triangulation systems) is “*motion of the mobile device along a trajectory of the trip*” (device geographical movement indicating it is moving along with a vehicle). (Ex. 1003, ¶¶ 425-428.)

[1-c] “based on the identified one or more physical states, separately generating two or more discrete distraction events separated in time, each of the discrete distraction events comprising concurrent motion of the mobile device and interaction with the mobile device by an occupant of the vehicle, and”

Olson’s system also detects distracted driving “*based on the identified one or more physical states.*” Again, sensor and other data is used to determine device movement and usage during a trip. (See, e.g., Ex. 1005, 2:37-43.) Additionally, Olson explains that “FIG. 3 illustrates a flowchart of an example process 300 for preventing a user from driving while distracted by user device 210.” (Ex. 1005, 5:42-45.) At step 320, it is “determining whether a user is driving....” (*Id.*, 7:9-12.) As explained, a “position tracking system” can be used to determine “whether the user is driving by determining whether the vehicle is moving.” (*Id.*, 7:10-17.) After the user is determined to be driving, “process 300” proceeds to “collecting usage data (block 330).” (*Id.*, 8:36-37.) This sequenced, multi-step process is shown in the below annotated version of Figure 3:

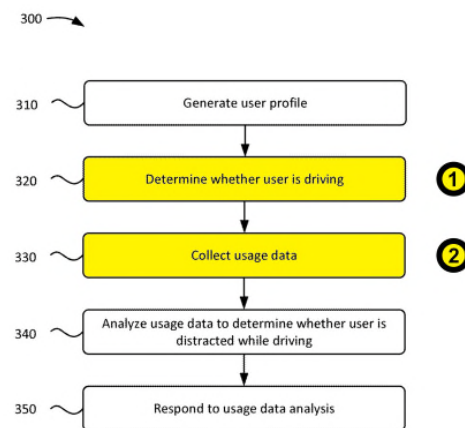


Fig. 3

(*Id.*, Fig. 3 (annotated).) As shown, Olson proceeds to (2) collect usage data only after it has (1) already determined that the user device is moving along with a vehicle. (*See id.*) Consistent with this, Olson repeatedly explains that it collects “usage data” “while the user drives the vehicle.” (*Id.*, 2:37-38 (emphasis added); *see also id.*, 3:5-6 (noting that the system “gather[s] information about the user while the user is driving”); 6:60-62 (similar).) Because of this, Olson’s system makes an assessment of device usage that is “**based**” on the previously “**identified ... physical state**”: sensor data is used to determine device usage, and this occurs after it has already been determined that the device is on a trip. (*See* Ex. 1003, ¶¶ 434-441.)

Next, in Olson “**each of the discrete distraction events comprising concurrent motion of the mobile device and interaction with the mobile device by an occupant of the vehicle.**” According to Olson, a “user device may collect usage data while the user drives the vehicle.” (Ex. 1005, 2:37-38; *see also id.*, 3:4-7; 6:60-64; 8:36-38.) Collected “usage data” can include various types of user interactions. For instance, “any type of input/output communicated between the user and user device” “such as the user pressing a button or typing information into the user device” can be detected. (*Id.*, 9:1-11.) Usage data can also include a “detect[ed] ... change in orientation of the user device 210 when the user moves” the device, or the “detect[ed] ... face of the user when the user glances at” the device’s display. (*Id.*; *see also id.*, 9:44-10:22; 10:46-59; Figs. 8-10.)

Olson also teaches that “a single usage instance may include a collection of related usage data....” (*Id.*, 13:16-18 (emphasis added).) Thus, “the relationship between types of usage data and a usage instance by user device 210 may be ... many to 1...” (*Id.*, 13:32-35.) In one provided example, a single usage instance can entail a “user viewing user device 210” “after a text message has been received....” (*Id.*, 13:26-32; *see also id.*, 10:25-35 (“if user device 210 undergoes an orientation change from horizontal to vertical shortly after receiving a text message, the change in orientation may be used to infer that the user is reading the text message and, therefore, distracted....”).) According to Olson, device viewing can be determined via, among other things, “detecting a change in orientation of user device 210 when the user moves user device 210....” (*Id.*, 9:1-11; 9:64-10:1.) Movement and orientation changes can be detected with “an accelerometer.” (*Id.*) Thus, each of Olson’s “usage instances” can involve both detected device motion (like device orientation changes) and contemporaneous user interaction (like text message receipt or transmission). (*See* Ex. 1003, ¶¶ 429-433, 442-446.)

Next, rather than limiting itself to single, isolated usage instances, Olson system detects repeated usage and “***generat[e] two or more discrete distraction events separated in time***” as required. According to Olson, the “[u]ser device 210 may ... collect degree, time frequency, and other types of information regarding the user viewing user device 210....” (Ex. 1005, 10:59-62.) For instance, “[a]s shown

in Fig. 11,” the “device ... may collect usage data corresponding to” multiple separate “operations 1110-1150 along timeline 1160.” (*Id.*, 11:22-25.) In the figure’s example, the device: (1) first detects receipt of “a text message (block 1110)” at an initial time, (2) detects provision of the “text message to a user ... by for example, generating a prompt (e.g., a beep, a ding, a ring, a vibration, etc.)” at different, later time (block 1120), (3) “detect[s] user viewing user device 210 (block 1130)” at further later time, (4) detects the “generate a text message” response “from the user (block 1140)” at yet another later time, and (5) detects “send[ing] the text message (block 1150)” at a final time. (*Id.*, 11:24-40.)

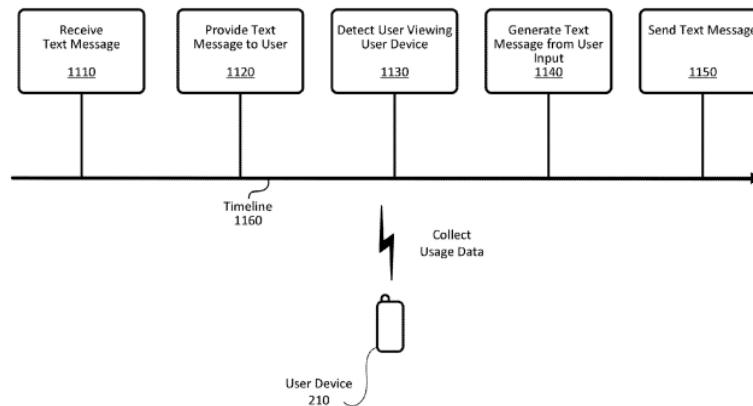


Fig. 11

(*Id.*, Fig. 11.) In sum, Olson’s system collects “[u]sage data corresponding to” distinct and separate “operations 1110-1150,” along with “time information (e.g., a timestamp)” corresponding to each of the operations. (*Id.*, 11:40-44.)

Similarly, Olson explains that its system considers multiple “usage instances” to determine if a driver “distracted by user device 210.” (*Id.*, 13:1-16.) “[A] single

usage instance may include a single type of usage data, such as the user viewing a display ..., the user accessing an application ..., a user inputting information ..., etc.” (*Id.*, 13:12-16.) Many different “usage instances” can occur and be detected over a given “time interval.” (*Id.*, 13:7-10.)

Olson explains that by detecting these separate operations or usage instances over time, its system can “determine whether, and/or how severely, the user of user device 210 is distracted by user device 210.” (*Id.*, 12:3-5.) Each detected operation or usage instance 1110-1150 constitutes a “*separately generat[ed]*” “*discrete distraction event[]*.” And, as shown in Figure 11, these various detected operations or usage instances are “*separated in time*” along timeline 1160 as this claim limitation requires. (Ex. 1003, ¶¶ 447-456.) Again, per Olson each of these discrete usage instances can entail multiple types of usage data, including both accelerometer detected device movement / orientation changes and an interaction event, like the sending or receiving of a text message. (Ex. 1005, 13:11-37; Ex. 1003, ¶ 457.)

[1-d(1)] “determining a distraction episode that extends from a start to an end of an interval and encompasses two or more of the discrete distraction events occurring in the interval and during the trip in the vehicle,”

Olson’s system operates to “determine whether the user is distracted by the user device while driving....” (Ex. 1005, 1:54-57.) To do so, it “analyz[es]” collected “usage data....” (*Id.*, 12:6-8; Fig. 3.) According to Olson, “[u]ser device 210 may implement one or more of a variety of techniques for analyzing usage data

to determine whether driver ... is distracted.” (*Id.*, 12:10-12.) “For example, user device 210 may define a distraction threshold ... and determine that the driver is distracted when usage data exceeds the distraction threshold.” (*Id.*, 12:13-27.)

“FIG. 13 illustrates an example representation of usage instances over recurring time intervals in determining whether a user is distracted by user device 210.” (*Id.*, 13:1-3.) “As shown, graph 1310 includes usage instances for three different time intervals, time interval A, time interval B, and time interval C.” (*Id.*, 13:39-41.) While usage did not exceed a threshold during intervals A and B, “the number of instances of time interval C exceeded distraction threshold 1340 within pre-selected time interval 1350.” (*Id.*, 13:41-45.) This leads to the determination “that the user is distracted during time interval C....” (*Id.*, 13:47-53.)

As exemplified in the below annotated version of Fig. 13, Olson teaches what this limitation requires. Olson’s individual “usage instances” are the claimed **“discrete distraction events.”** The series of usage instances—all of which occurred during a **“trip in the vehicle”**—that exceed threshold 1340 within time interval 1350 (red highlighted collection of “Usage Instances” spanning “Time Interval C”) are an example of a **“distraction episode.”** And, this episode has a **“start”** (time 0) and an **“end”** (the time when interval C concludes) spanning an **“interval”** (Time Interval C):

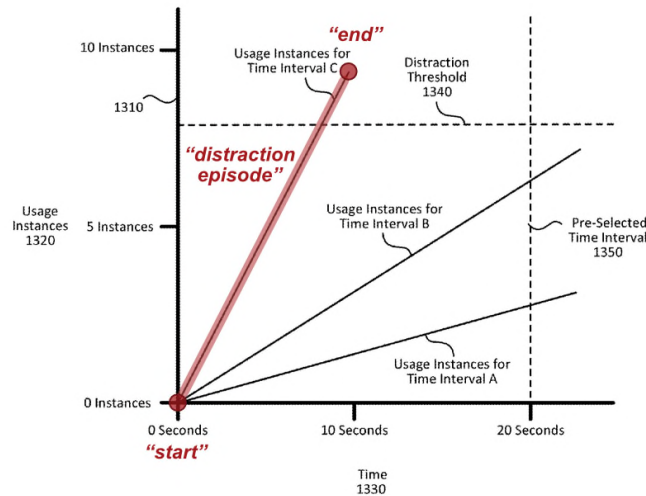


Fig. 13

(Id., Fig. 13 (annotated)).

Figure 11 of Olson provides another, more specific example. Here, a user device detects “operations 1110-1150 along timeline 1160” for purposes of determin[ing] whether ... the user of user device 210 is distracted” while driving. (Id., 11:21-46.) Operations 1110-1150 are different instances of device usage, such as the receipt, viewing, and sending of text messages. (Id.) As shown, they occur at different times along “timeline 1160.” (Id., Fig. 11.) Thus, each is an example of a **“discrete distraction event[.]”** Further, because the various events analyzed together to determine if “the user of user device 210 is distracted” (id., 11:40-46), they collectively constitute a **“distraction episode.”** Further, this episode has both a **“start”** (the time when first usage instance 1110 occurs) and an **“end”** (the time when last usage instance 1150 occurs) along an **“interval”** (the portion of timeline 1160 spanned by instances 1110-1150):

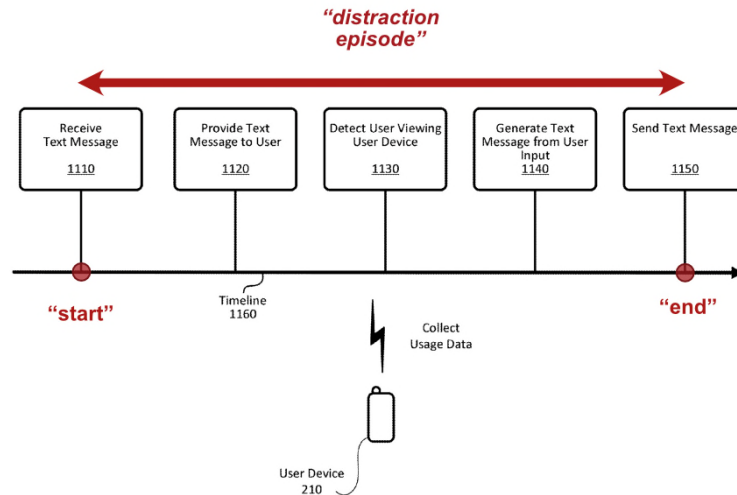


Fig. 11

(*Id.*, Fig. 11 (annotated); *see also* Ex. 1003, ¶¶ 458-474.)

[1-d(2)] “the determining of the distraction episode comprising determining a possible distraction episode and after the possible distraction episode is determined, determining that the possible distraction episode comprises a true distraction episode.”

Olson’s system is able to distinguish distraction episodes that are “merely ... suspicious” from those that are “certain.” (Ex. 1005, 12:38-44.) To accomplish this, “user device 210 may define distraction thresholds for different levels of confidence with respect to the user being distracted. For instance, user device 210 may define a distraction threshold that corresponds to merely being suspicious that a user is distracted and other distraction threshold for being certain that the user is distracted.” (*Id.*, 12:38-44.) This allows for different responses depending on the “level of confidence regarding the user actually being distracted.” (*Id.*, 12:45-60.) A user may simply receive an “audio message” if the distraction is only “suspicious.” (*Id.*,

12:48-51.) But, if the distraction is “certain,” device features may be disabled. (*Id.*, 12:52-56; *see also* Ex. 1003, ¶¶ 475-479.)

Again, a POSITA would have considered it obvious to employ a lower usage instance threshold for “suspicious” distractions, and a higher usage instance threshold for “certain” distractions. (*See id.*, ¶¶ 480-481.) Fewer usage instances would result in a “suspicious” distraction,” while more usage instances would result in a “certain” distraction.” As explained, Olson’s system is already able to continue monitoring for distraction instances after preliminarily determining distraction: the system “may ... respond to a usage data analysis” indicating distraction “by continuing to collect usage data....” (Ex. 1005, 14:19-22; *see also id.*, 15:14-20.) Thus, as usage instances accumulate, Olson’s system would first determine there to be a “suspicious” distraction when the first, lower threshold is crossed. (*See* Ex. 1003, ¶¶ 482-483.) And, it would then later determine there to be a “certain” distraction when the second, higher threshold is crossed. (*See id.*, ¶ 484.) Put another way, just as this limitation requires system will operate to first determine a **“possible distraction episode”** (the initial “suspicious” distraction) and then determine **“that the possible distraction episode comprises a true distraction episode” “after the possible distraction episode is determined”** (the later “certain” distraction). (*See id.*, ¶ 485.)

2. Claim 2

Claim 2 depends on claim 1 and further requires:

“the one or more physical states comprises an operational state of the mobile device”

In Olson, “[u]sage information ... may include any type of input/output communicated between the user and user device 210.” (Ex. 1005, 9:1-3.) This can include “active inputs” like a “user pressing a button or typing information into the user device” or “providing audio commands via a microphone[.]” (*Id.*, 9:4-11.) Device outputs, along with the device’s “executing” of “one or more types of operations” like “initiating a telephone call” or “generating a text message,” also constitute collected usage information. (*Id.*, 9:21-41.) This all relates to the **“operational state of the mobile device.”** (Ex. 1003, ¶¶ 486-491.)

3. Claim 3

Claim 3 depends on claim 2 and further requires that:

“the operational state comprises a state of locking of the mobile device”

Olson system collects a variety of “usage data.” (Ex. 1005, 8:36-37.) This includes any “type of information that may be relevant to determining whether the user of” a “user device ... is, or may become distracted by” the device. (*Id.*, 8:37-41; *see also id.*, 9:1-5.) For instance, as explained in connection with claim 2, Olson’s system can both “monitor inputs/outputs of the user device, and track internal processes executed by the user device.” (Ex. 1005, 2:37-43; *see also supra*

Section XI.A.2.) And, it is able to determine “whether the user has been, or is, viewing user device.” (Ex. 1005, 12:24-25.) Thus, the system differentiates between situations where a “[u]ser device” merely “receive[s] a text message” from those where the user opens or activates the device for purposes of “viewing” the received message. (See *id.*, 11:24-36; see also Ex. 1003, ¶¶ 492-497.)

While Olson does not use the phrase “*state of locking*,” a POSITA would have understood (or at least consider it obvious) that this is one of the many types of usage data Olson’s system detects. (See *id.*, ¶ 498.) Again, Olson teaches that any usage data pertinent to distraction is collected and considered. Whether the device is locked or unlocked is one such type of data. (See *id.*, ¶¶ 499-500; see also Ex. 1004, 2:46-47 (explaining that “mobile device usage” can be detected from “a mobile device unlock or a mobile device lock.”).) Moreover, Olson’s system is meant to be able to differentiate situations where a user activates and uses a device (see, e.g., Ex. 1005, 11:24-36; Fig. 12) from those where the user does not (e.g., *id.*, 10:25-30). A POSITA would have recognized that device locking/unlocking data could obviously facilitate Olson’s ability to make these types of determinations. (See Ex. 1003, ¶¶ 501-502.)

4. Claim 4

Claim 4 depends on claim 3 and further requires that:

“the operational state comprises a state of a phone call”

One of the pieces of usage data that can be monitored for by Olson’s system is the “initiating [of] a telephone call.” (Ex. 1005, 9:25-29; *see also* Ex. 1003, ¶¶ 503-505.)

5. Claim 5

Claim 5 depends on claim 4 and further requires that:

“the operational state comprises a power condition”

Again, Olson’s system collects various mobile device “usage data,” such as “active” and “passive” “inputs/outputs of the user device” and data relating to the performance of “internal processes executed by the user device.” (Ex. 1005, 2:37-43; 8:36-37.) This data will obviously only be generated if the device is in a powered-on state. (*See* Ex. 1003, ¶¶ 506-509.) Thus, a POSITA would understand that Olson—via its detection of data only generated when a device is powered—also identifies **“a power condition”** of a mobile device. (*See id.*, ¶ 510.)

6. Claim 6

Claim 6 depends on claim 4 and further requires that:

“the operational state comprises an aspect of a foreground app running on the mobile device”

As shown in Figure 12, Olson teaches that both receipt of “a command from the user to open [an] application” and whether the user device is “display[ing] the application to the user” are examples of “usage data” that may be employed in

making a distraction determination. (Ex. 1005, 11:47-55, 63-67; Fig. 12; *see also* Ex. 1003, ¶¶ 511-514.)

7. Claim 7

Claim 7 depends on claim 1 and further requires that:

“determining a distraction episode comprises determining that a physical state of the mobile device comprises no interaction by a user or that accelerometer or gyroscope values are lower than a threshold that differs from a threshold used in determining motion of the mobile device at the start of the distraction episode”

After making a distraction determination, Olson’s “user device 210” can “continue to monitor the movements of user device” for purposes of “re-enabl[ing] ... disabled features of user device 210....” (Ex. 1005, 15:14-20.) While Olson provides an example where this re-enabling decision is premised on the user “no longer driving the vehicle” (*id.*), it also would have been obvious to monitor for usage to end. Showing this, Olson itself explains that “user device 210” is able to “analyze[] usage data for a user and determine[] that the user is not distracted.” (*Id.*, 14:16-17; *see also* Ex. 1003, ¶¶ 515-520.) This is all this claim requires: **“determining that a physical state of the mobile device comprises no interaction by a user.”** (*Id.*)

8. Claim 8

Claim 8 depends on claim 7 and further requires that:

“the end of the distraction episode is not determined until after a refractory period of no further movement of the mobile device or no indication of a continued distraction”

Again, Olson teaches a system that can detect driver distraction from, among other things, mobile device usage, movement, and orientation changes. (See Ex. 1005, 9:1-11; 9:64-10:1.) In addition to detecting distraction, the system also “analyze[] usage data for a user and determine[] that the user is not distracted.” (*Id.*, 14:16-17.) Thus, if the system has determined that the driver is distracted and “disabled” device features, it will “continue to monitor the movements of the user device” to determine when the distraction has ended for purposes of “re-enabling the disabled features....” (*Id.*, 15:14-20.) Moreover, as part of making usage determinations, Olson’s system “collect[s] degree, time, frequency, and other types of information....” (*Id.*, 10:59-62; *see also* 11:12-16.) This allows it to track when a series of related “usage instances” occur along a “timeline.” (*Id.*, 11:21-46; Fig. 11.) The system can detect “successive” series of “usage instances” occurring at “time intervals” that do not “begin[]” until after “the conclusion” of another, different proceeding series of usage instances. (*Id.*, 13:49-53.)

In sum, Olson’s system (1) determines device usage and distraction from movement and other data, (2) collects usage time and frequency information, (3) determines that a previously distracted user is no longer distracted, and (4) recognizes that one series of related usage instances indicating distraction has ended

while another has begun. (See Ex. 1003, ¶¶ 521-529.) Given all this, a POSITA would have understood (or at least considered it obvious) that Olson system is able to determine that distraction has ended by considering whether there has been no device movement and usage for a period of time. (See *id.*, ¶¶ 530-531.) This is all this claim requires: determining that a **“distraction episode”** has ended after a **“refractory period”** of either **“no further movement”** or **“no indication of a continued distraction.”** (See *id.*)

9. Claim 9

Claim 9 depends on claim 8 and further requires that:

“determining an end of the distraction episode comprises determining that a context of the mobile device indicates no further distraction”

As explained above, the '249 patent explains that “contextual information” relating to distraction includes, among other things, “the start and end locations of the trip...” (Ex. 1001, 2:30-34.) Olson considers this same type of device **“context”** information to determine that there is **“no further distraction.”** In particular, Olson’s system can determine that a driver is no longer distracted by a user device if “the movements of the user device” indicate that “the user is no longer driving the vehicle.” (Ex. 1005, 15:14-20.) The system is also able to “differentiate between whether, for example, the user has pulled the vehicle over in order to operate user device ... in a safe environment or whether the user is merely stopped at a traffic light, in a traffic jam, etc.” (*Id.*, 4:51-57; see also Ex. 1003, ¶¶ 532-537.)

10. Claim 10

Claim 10 depends on claim 9 and further requires that:

“determining that the possible distraction episode comprises a true distraction episode includes determining that a time period spanned by the possible distraction episode is longer than a predetermined length”

As explained, Olson’s system distinguishes between “suspicious” and “certain” distractions using predetermined “thresholds.” (See Ex. 1005, 12:38-60.) The system can employ both “usage instances” and “time” thresholds when doing so. (*Id.*, Fig. 13.) And, Olson explains that its system can consider whether a given value is both “less than” or “greater than” a given threshold. (See *id.*, 16:51-64.) It also considers usage “degree, time, and frequency ... information” to assess “how severely the user is distracted.” (*Id.*, 10:59-62; 11:12-16.; see also Ex. 1003, ¶¶ 538-543.)

A POSITA would have considered it highly obvious that distraction sessions extending over a **“time period”** that is **“longer”** as this claim requires would obviously result in a higher degree of distraction certainty. (See *id.*, ¶¶ 544-545.) A POSITA would have understood that longer distraction sessions likely entail greater numbers of related distraction events, and a corresponding increase in the time in which the driver is diverted from focusing on safe driving. (See *id.*, ¶¶ 80-81, 91, 101, 545.) This in turn makes the distraction more serious and more likely to be a “certain” or a **“true distraction episode”** as required. (See *id.*)

B. Motivation to Combine

A POSITA would have considered it obvious and would have been motivated to apply and combine the various teachings of Olson in the manner discussed above. (See Ex. 1003, ¶¶ 547-567.)

First, a POSITA would have been motivated to implement Olson's system such that it simultaneously or concurrently considers both device motion and interaction data when determining whether a "usage instance" has occurred. (See *id.*, ¶¶ 548-559.) Olson itself already contemplates and teaches that a "single usage instance" can "include a collection of related usage data." (Ex. 1005, 13:16-24.) A POSITA would consider the concurrent use of motion and interaction data to be nothing more than one of the multiple different design choices Olson presents. (See Ex. 1003, ¶¶ 549-550.)

Moreover, Olson explains that considering both device motion and interaction can increase the accuracy of its system. For example, "[d]etermining an orientation of user device 210" along with usage "may better enable user device 210 to determine whether the user is distracted...." (Ex. 1005, 10:23-25.) The device can determine that no usage occurred if "the display-side" is "facing downward." (*Id.*, 10:25-30.) Alternatively, if the device "undergoes an orientation change from horizontal to vertical shortly after receiving a text message, the change in orientation

may be used to infer that the user is reading the text message and, therefore, distracted by user device 210.” (*Id.*, 10:30-35.)

This would have motivated a POSITA to employ both motion and interaction data concurrently. (*See* Ex. 1003, ¶¶ 551-559.) Olson can respond to detected distraction in a variety of ways, including by “activating a braking system of the vehicle” or “communicating a warning to ... law enforcement....” (Ex. 1005, 13:65-14:8.) Given the severity and seriousness of these responses, a POSITA would have been motivated to ensure that the distraction determinations made by Olson’s system are accurate. (*See* Ex. 1003, ¶¶ 557-559.) By simultaneously considering multiple types of data, a POSITA would have recognized that the system would be better able to better distinguish events that should not be considered usage instance from events that should be so considered. (*See id.*, ¶¶ 557-558.) This would in turn avoid unnecessary responses, like application of the brakes or notification of law enforcement when the driver is not actually distracted. (*See id.*, ¶ 559.)

Second, a POSITA would also have been motivated to implement Olson’s system such that it is able to first determine a possible/suspicious distraction, and then later upgrade this determination to a true/certain distraction. (*See id.*, ¶¶ 560-567.) Olson already teaches that it able to distinguish “suspicious” from “certain” distractions. (*E.g.*, Ex. 1005, 12:38-44.) A POSITA would have recognized that making “suspicious” and “certain” distraction determines sequentially allows for

escalating responses. (See Ex. 1003, ¶ 562.) For example, a small number of distraction instances would produce a less invasive response (like a notification). (*Id.*, ¶ 563.) Continued distraction instances, however, would produce increasingly invasive responses like device deactivation, vehicle braking, or law enforcement notification. (See *id.*, ¶ 564.) A POSITA would have been motivated to implement Olson to employ this type of sequential response both because it would afford the driver with an opportunity to self-correct (a small number of distraction instances would result only in notification), and would limit more extreme responses to circumstances where they are actually merited (the driver continues to accrue distraction instances despite prior notifications). (See *id.*, ¶¶ 565-568.)

A POSITA would also have had a more than reasonable expectation of success. (See *id.*, ¶¶ 568-572.) As explained, Olson’s system is already open to the collection and use of both motion and interaction data. (See, *e.g.*, Ex. 1005, 10:25-35; 13:16-18; 13:32-35.) Further, Olson explains that collected usage data can be analyzed in variety of ways. (*Id.*, 12:10-12.) A POSITA would consider use of multiple types of data simultaneously, and the sequential determination of a “suspicious” and “certain” distraction to be nothing more than variations on what Olson already teaches. Given this, a POSITA would have every reason to believe—and no reason to doubt—that Olson’s system could be designed to include these features and operations. (See Ex. 1003, ¶¶ 569-572.)

XII. Conclusion

For the foregoing reasons, Petitioner respectfully requests institution of IPR and cancellation of claims 1-10.

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

The undersigned certifies that the foregoing PETITION FOR *INTER PARTES* REVIEW complies with the type volume limitation in 37 C.F.R. § 42.24(a). According to the utilized word-processing system's word count, the petition—excluding the caption, table of contents, table of exhibits, mandatory notices, certificate of word count, and certificate of service—contains 13,987 words.

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CERTIFICATE OF SERVICE

The undersigned hereby confirms that the foregoing PETITION FOR IPR and associated exhibits were caused to be served on 9/25/23 via overnight courier upon the following counsel of record for Patent Owner:

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