

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

MAKOR ISSUES & RIGHTS LTD.,
Patent Owner.

Case IPR2016-01537
Patent 6,615,130 B2

Before HYUN J. JUNG, BEVERLY M. BUNTING, and
ROBERT L. KINDER, *Administrative Patent Judges*.

BUNTING, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

Google, LLC, (“Petitioner”),¹ filed a Petition pursuant to 35 U.S.C. §§ 311–319 requesting *inter partes* review of claims 1–4 (the “challenged claims”) of U.S. Patent No. 6,615,130 B2 (Ex. 1001, “the ’130 patent”). Paper 2. Patent Owner, Makor Issues & Rights Ltd. (“Patent Owner”) filed a Preliminary Response. Paper 7. Upon consideration of the information presented in the Petition, we determined that there was a reasonable likelihood that Petitioner would prevail with at least one challenged claim, and instituted this trial, pursuant to 35 U.S.C. § 314(a), as to claims 1–4 of the ’130 patent. Paper 9 (“Decision on Institution” or “Dec.”).

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 14, “PO Resp.”), and Petitioner filed a Reply (Paper 16, “Reply”). We ordered (Paper 21) the parties to concurrently submit a claim construction brief addressing whether any limitation of the challenged claims is subject to § 112 ¶ 6. Papers 25, 26. A transcript of the oral hearing held on October 19, 2017, has been entered into the record as Paper 27 (“Tr.”).²

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we conclude that Petitioner has not demonstrated, by a preponderance of the evidence, that claims 1–4 of the ’130 patent are unpatentable.

¹ Petitioner submitted an updated mandatory notice indicating that Google Inc., changed its name to Google LLC on September 30, 2017. Paper 24.

² Both parties requested to present arguments collectively for IPR2016-01535, IPR2016-01536, and IPR2016-01537. Paper 19, 20, 22, and 27.

A. Real Party-in-Interest

Petitioner names itself and Waze Inc. as the real parties-in-interest.
Pet. 2.

B. Related Proceedings

The parties state that the '130 patent has been asserted in *Makor Issues & Rights Ltd. v. Google Inc.*, Case No. 1:16-cv-00100 (D. Del.). Pet. 2; Paper 6, 1. Petitioner filed additional petitions challenging the patentability of the '130 patent and a related patent:

1. IPR2016-01535 (U.S. Patent No. 6,480,783)
2. IPR2016-01536 (U.S. Patent No. 6,615,130)
3. IPR2017-00815 (U.S. Patent No. 6,480,783)
4. IPR2017-00816 (U.S. Patent No. 6,480,783)
5. IPR2017-00817 (U.S. Patent No. 6,480,783)
6. IPR2017-00818 (U.S. Patent No. 6,615,130)

C. The '130 patent (Ex. 1001)

The '130 patent is titled “Real Time Vehicle Guidance and Traffic Forecasting System.” Ex. 1001, (54). The '130 patent issued on September 2, 2003, from U.S. Patent Application No. 09/800,116 filed on March 6, 2001, and is a continuation-in-part of application No. 09/528,134, filed on March 17, 2000. *Id.* at (45), (21), (22), and (63).

The '130 patent relates generally to “communication with vehicles for the purpose of supplying traffic condition information and analyzing data relating to traffic conditions.” *Id.* at 1:14–16. The specification describes a vehicle guidance system, which includes the Central Traffic Unit (“CTU”) and a fleet of vehicles or Mobile Guidance Units (“MGUs”), “i.e., traveling vehicles with mobile phones connected to the communication system.” *Id.*

at 3:27–29. Vehicle position is monitored using a wireless technology, *e.g.*, “GSM/GPS” while the vehicle is moving, and “by concurrent measuring of their current travel times along a broad range of roads.” *Id.* at 3:35–36. The vehicle driver may request route guidance reflecting the fastest route to a destination, as well as an updated route based on real time traffic information as illustrated in Figure 1, reproduced below. *Id.* at 3:37–49.

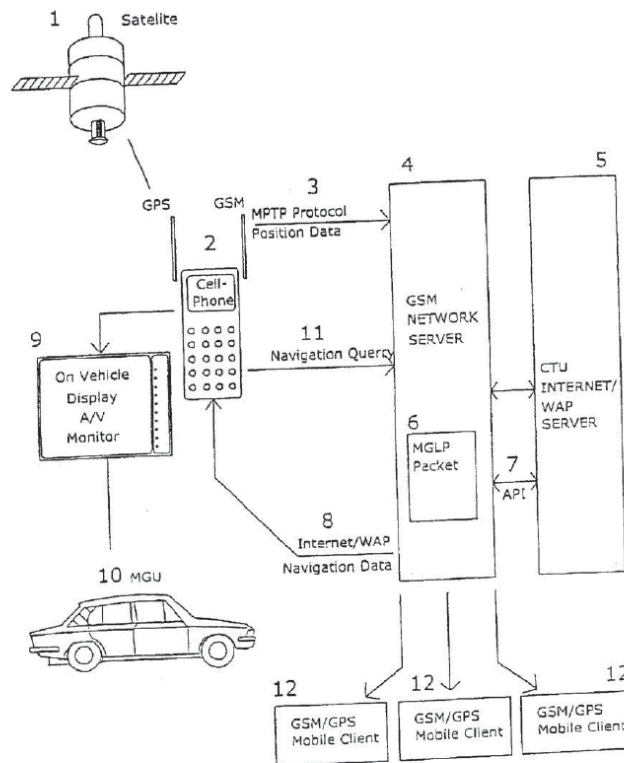


Figure 1 illustrates information exchange in the guidance system.

The CTU collects traffic congestion data using the location of MGUs mounted in a fleet of vehicles traveling throughout a broad range of road systems. *Id.* at 6:45–49. The location data is stored “on the GSM Network Server in Multiple-GPS Locator Packet (MGLP).” *Id.* at 6:49–51. The CTU processes the location data, converts into travel time data, and stores the

travel time data in the database for use as regular travel time data and current travel time data, and for use in calculating the fastest route. *Id.* at 6:54–57.

Updating of planned routes in the CTU is accomplished using “both statistical (empirical) travel times and current travel times.” *Id.* at 11:6–8. The ’130 patent discloses that current travel times are utilized in the vicinity of the present vehicle location and statistical travel times elsewhere. *Id.* at 11:20–23. The ’130 patent also discloses that geographic areas may be subdivided into subregions, referred to as zones. *Id.* at 11:24–31. As a vehicle enters a zone, the IMU database receives updated information pertaining to traffic load in the neighborhood. *Id.* at 11:33–37. Updating of relevant traffic jam information is accomplished based on local zones. *Id.* at 11:49–50.

The ’130 patent describes three techniques for determining travel time over a road segment based on factors categorized as (i) generally stable changes in road conditions, (ii) regular or predictable changes in road conditions, and (iii) sudden unpredictable changes in road conditions. Ex. 1001, 11:52–12:11. Theoretical travel times are based on a calculation of road or section length and maximum speed allowed on the section. *Id.* at 11:52–67. Statistical or empirical travel times are considered better approximations to reality than theoretical travel times because factors in the second category of regular predictable changes in road conditions are taken into account. *Id.* at 12:28–32. The statistical or empirical travel times are averaged, transformed into empirical speed coefficients, and stored in a central database. *Id.* at 12:35–42. Eventually, theoretical travel times are replaced by statistical or empirical travel times. *Id.* To account for traffic conditions arising from sudden and unexpected circumstances, which result

in excessive travel times, these slowdowns “are identified and stored in the database for a limited period of time,” and utilized to provide real time capabilities. *Id.* at 12:51–52.

Utilizing GSM/GPS or other wireless technologies, the CTU tracks the positions of MGUs and updates in real time the database of travel times for all roads. *Id.* at 12:57–60. The ’130 patent discloses that

[i]n response to a request from a driver for a route update from his present position to a desired location, it calculates the desired fastest route by utilizing both the regular travel times along segments of roads and predicted current travel times found by using information collected from tracking routines. Thereafter, the route is communicated to the driver.

Id. at 12:60–66.

The ’130 patent discloses that rapid, unpredictable changes in road conditions may be accounted for in calculating real time optimal routes. *Id.* at 13:36–40. As described in the ’130 patent, the guidance system maintains special data structures associated with certain road types that make it possible to store information about changed traffic conditions and use the information for predicting future traffic conditions within a short time range by using travel times of vehicles that have recently left the corresponding section in the CTU database. *Id.* Additionally, the ’130 patent describes a method for route planning referred to as algorithm Z that “utilizes stratification of road networks into a hierarchy of layers, executes searches separately on each layer, and then combines the obtained results to produce a solution route.” *Id.* at 16:60–64. According to the ’130 patent, use of algorithm Z for route planning “leads to considerable reduction in search times.” *Id.* at 16:63–64.

C. Illustrative Claim

Claim 1 is independent and claims 2–4 depend therefrom. Claim 1 is illustrative of the claims at issue and is reproduced below:

1. A system for real time vehicle guidance and forecasting travel times within a predetermined travel region, the system comprising:
 - central traffic unit (CTU), mobile guidance units (MGU), and communication system (COS)
 - the COS providing wireless communications for communicating with client vehicles;
 - the CTU operatively connected to the communications system, the CTU performing a computed route search based on current and statistical section data;
 - a receiving device for collecting GPS data at predetermined time intervals from sample vehicles moving within the predetermined travel region, and operatively connected to the CTU;
 - said CTU operatively connected to the communications system capable of processing in real time said GPS data and transforming them into appropriately structured data;
 - a database suitable for storing and updating statistical data on traffic parameters on at least a limited number of individual roads as sensed by the sample vehicles;
 - computational tools for automatic identification of real time traffic jam conditions at various locations of the individual roads by utilizing the sample vehicles for measuring time delays; and
 - the central traffic unit further comprising:
 - a map database containing digital road maps of a predetermined geographical region together with predetermined relevant data on road factors, including data on speed limits, road capacity, road intersections, and street directional designations;
 - a server for processing the location data received from MGUs and transforming them into structured data suitable for storage;

- a database suitable for storing and updating statistical data on traffic parameters on at least a limited number of individual roads as sensed by the sample vehicles;
- a table of administrator wherein said statistical data is further subdivided according to time into subdivisions;
- statistical application for collecting said structured data, computing individual statistical travel time estimates for at least said limited number of individual roads, and storing the results in the table of administrator according to said subdivisions;
- statistical application for collecting structured GPS data, computing individual statistical travel time estimates (regular times) for predetermined roads, and storing the results, the statistical application periodically updating the statistical data using statistical criteria for determining volumes of data necessary for obtaining valid and reliable estimates, the estimates having a predetermined validity;
- computational tools for dividing said geographical region into a number of smaller geographical zones for reducing volumes of traffic parameter data broadcast to client vehicles;
- software for calculation of said current travel times in traffic congestion based on said travel time traffic updates, thereby minimizing reliance on vehicle speed estimates, thereby increasing the reliability and stability of resulting statistical estimates; and
- software for calculation of fastest travel routes using said current travel time estimates in the zones contiguous to the vehicle while using statistical travel times in the zones situated further from the vehicle.

Id. at 19:31–20:34.

D. Evidence Relied Upon

Petitioner relies on the following references:

References	Patents	Date	Exhibits
TravTek	<i>TravTek System Architecture Evaluation by U.S. Dept. of Transportation</i> , Pub. No. FHWA-RD-94-141 (July, 1995).	July, 1995	1004
Roozemonid	Danko A. Roozemonid, <i>Forecasting Travel Times Based on Actuated and Historic Data</i> .	1997	1005
Sumner	U.S. Pat. No. 5,164,904	Nov. 17, 1992	1010
Booth	PCT Pat. Pub. WO 98/54682	Dec. 3, 1998	1011

Additionally, Petitioner relies on the declaration and rebuttal declaration of Michael S. Braasch, Ph.D. (Exs. 1003, 1026) and Patent Owner relies on the declaration of Alex A. Kurzhanskiy, Ph. D. (Ex. 2002). The parties rely on other exhibits as discussed below.

E. Instituted Grounds of Unpatentability

We instituted the instant trial based on the following grounds of unpatentability (Dec. 27):

References	Basis	Claim(s) Challenged
TravTek, Sumner, and Roozemonid	§ 103(a) ³	1, 3, and 4
TravTek, Sumner, Roozemonid, and Booth	§ 103(a)	2

³ The relevant sections of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (Sept. 16, 2011), took effect on March 16, 2013. Because the application from which the ’130 patent issued was filed before that date, our citations to Title 35 are to its pre-AIA version.

II. ANALYSIS

A. *Legal Principles*

In *inter partes* reviews, petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to the patent owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail in this proceeding, Petitioner must support its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). Accordingly, all of our findings and conclusions are based on a preponderance of the evidence.

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

We analyze the following ground based on obviousness in accordance with the above-stated principles.

B. *Level of Ordinary Skill in the Art*

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art;

prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). In that regard, Petitioner’s expert, Dr. Braasch, testifies that a person of ordinary skill in the art

would have had a combination of experience and education in electrical engineering and navigation systems. This typically would consist of a minimum of a bachelor degree in electrical engineering or a related engineering field plus 2-5 years of work and/or research experience in the field of electrical engineering and its subfield of navigation systems.

Ex. 1003 ¶ 20. Patent Owner does not opine on the level of ordinary skill in the art. *See generally* PO Resp.

As such, we adopt generally Petitioner’s assessment of a person of ordinary skill in the art. Namely, we find that the person of ordinary skill in the art would have (1) a bachelor of science in electrical engineering or a related engineering field, and (2) 2–5 years of experience in the field of navigation systems.

C. Claim Construction

The Board interprets claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278 (Fed. Cir. 2015) (“We conclude that Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA”), *aff’d*, *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131 (2016); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Under the broadest reasonable interpretation standard, and

absent any special definitions, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms or phrases must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Petitioner proposes constructions for the claim terms “GPS data” (Pet. 9–10); “computational tools for dividing said geographical region into a number of smaller geographical zones for reducing volumes of traffic parameter data broadcast to client vehicles” (*id.* at 10–11) and “software for calculation of said current travel times in traffic congestion based on said travel time traffic updates, thereby minimizing reliance on vehicle speed estimates; thereby increasing the reliability and stability of resulting statistical estimates” (*id.* at 11–12). Patent Owner does not challenge Petitioner’s proposed constructions in its Patent Owner Response. PO Resp. 4–7. Instead, Patent Owner proposes a construction for the term “traffic jam.” *Id.*

Additionally, Petitioner asserts that some claim elements “recite purely functional software untethered from any tangible medium” and may be subject to construction under 35 U.S.C. § 112, ¶ 6, but does not otherwise identify these claim terms or proffer a construction. Pet. 12. Based on this assertion, we requested that the parties submit additional claim construction briefing as to whether claim terms such as “receiving device for,”

“computational tools for automatic identification of real time traffic jam conditions,” “statistical application for collecting structured GPS data,” and “statistical application for collecting said structured data” could potentially fall within the realm of § 112 ¶ 6. Paper 21. Specifically, whether “receiving device for,” “computational tools for,” and “statistical application for” could potentially be “nonce” words—serving the same purpose of “means.” *Id.* at 4–6. The parties each submitted briefing (Papers 25, 26). Petitioner argues that we need not reach the § 112 ¶ 6 issue because such determination would have no effect in resolving this controversy. Paper 25, 8. Patent Owner argues that none of these terms “contains the word ‘means,’ and thus none of the terms carry a presumption that 35 U.S.C. § 112 ¶ 6 may apply.” Paper 26, 2. Having reviewed the parties’ additional claim construction positions in light of the record developed during trial, we agree that construction of these terms is not necessary to resolve the present controversy.

Having considered the evidence presented, we determine that express construction of the term “traffic jam” is necessary for purposes of this Decision. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”).

Claim 1 recites “computational tools for automatic identification of real time traffic jam conditions.” Ex. 1001, 19:53–54 (“automatic identification of real time traffic jam limitation”). Patent Owner argues:

‘traffic jam’ means an abnormal slowdown or bottleneck – one that is worse than a statistically computed, regular travel time on a section of a route. A typical or routine slowdown, *e.g.*, the

typical daily congestion during rush hour, does not qualify as a ‘traffic jam’ within the ’130 Patent.

PO Resp. 4. Patent Owner asserts that its proposed construction distinguishes between a “traffic jam” and “routine congestion” based on the language of claim 1 as well as the Specification. *Id.* at 4–5. Specifically, Patent Owner argues that the recitation in claim 1 of “a database suitable for storing and updating statistical data on traffic parameters . . . as sensed by the sample vehicles,” would include regularly occurring traffic congestion. *Id.* (citing Ex. 2002 ¶¶ 6–7).

Patent Owner also directs us to the Specification of the ’130 patent, which distinguishes between normal congestion and abnormal traffic conditions in its discussion of “Current Travel Times.” PO Resp. 5. For example, Current Travel times are used

when (1) there is a sufficient number of vehicles reporting a bottleneck in a sufficiently recent time period and, (2) when ‘each of [the vehicles] has spent considerably more time on [a section] S than the corresponding [Regular Travel Time], then the situation can be interpreted as a bottleneck on the section S.’

Id. (citing Ex. 1001, 14:59-61). Otherwise, Regular Travel Times are utilized for route guidance. *Id.* Relying on the testimony of Dr. Kurzhanskiy, Patent Owner explains that “[o]nly during atypical slowdowns are ‘current travel times, which reflect sudden and unpredictable changes in traffic conditions,’ used instead of Regular Travel Times.” *Id.* at 5–6 (citing Ex. 2002 ¶ 9). Patent Owner also directs us to the passage in the Specification describing the requirement that each vehicle must have experienced a specified slowdown. *Id.* at 6–7 (citing Ex. 1001, 15:1–6).

Based on its understanding, Patent Owner defines “traffic jam” as an “unpredictable (irregular or abnormal) slowdown of all traffic on a segment

during a time frame, relative to the regular, statistically established travel time for that segment during that time frame.” *Id.* at 7 (citing Ex. 2002 ¶¶ 10–11).

Petitioner did not propose a construction for the term “traffic jam” in its Petition, but addresses Patent Owner’s position in its Reply. *See* Pet. Reply 1–8. Petitioner contends that we should adopt the “plain and ordinary” meaning of “traffic jam,” and that Patent Owner has proposed an “overly-narrow construction of ‘traffic jam.’” *Id.* at 1; Tr. 10:15–17. Petitioner argues that Patent Owner’s proposed construction is not supported by the Specification, extrinsic evidence, and it is inconsistent with Patent Owner’s own expert testimony. Pet. Reply 1. Petitioner notes that Patent Owner proposed a different construction in the related district court litigation. *Id.* (citing Ex. 1031, 13).

Petitioner argues that Patent Owner’s construction is overly narrow and not supported by the Specification of the ’130 patent or extrinsic evidence. *Id.* Specifically, that Patent Owner’s interpretation is factually and legally erroneous because (1) “[t]he ’130 patent does not provide a lexicographer’s definition of ‘traffic jam’” (*id.* at 2); (2) “[t]he plain language of claim 1 does not impart a specialized meaning onto the term ‘traffic jam’” (*id.* at 6); and (3) Patent Owner’s “construction is inconsistent with the plain and ordinary meaning of the term ‘traffic jam’” (*id.* at 7).

Although Petitioner does not provide a specific definition of “traffic jam,” (Tr. 10:15–17) Petitioner indicated at oral argument that “the idea that a traffic jam, which I think is consistent with the claimed ordinary meaning of the term, can be identified as a comparison between what is currently

going on and some set of expectations defined in some way but can also be defined as any predetermined value.” Tr. 8:11–15.

In construing the claims, our analysis begins with, and remains centered on, the language of the claims themselves. *See Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001). “[C]laims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their ‘broadest reasonable interpretation.’” *In re Marosi*, 710 F.2d 799, 802 (Fed. Cir. 1983) (quoting *In re Okuzawa*, 537 F.2d 545, 548 (CCPA 1976)). “T]he broadest reasonable interpretation must be reasonable in light of the claims and specification.” *PPC Broadband, Inc. v. Corning Optical Commc’ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016). The broadest reasonable interpretation does not mean the broadest possible interpretation, our construction “cannot be divorced from the specification and the record evidence.” *In re NTP, Inc.*, 654 F.3d 1279, 1288 (Fed. Cir. 2011).

The disagreement between the parties centers on whether “traffic jam” should be construed in a broader lay sense as proposed by Petitioner or whether the term should be construed in accordance with the more specific descriptions found in the Specification, as proposed by Patent Owner. As addressed in more detail below, we decline to adopt Patent Owner’s proposed claim construction in whole because it adds unnecessary ambiguity. For example, “irregular or abnormal” do not add clarity or meaning to the definition. If a feature is not necessary to give meaning to what the inventor means by a claim term, it would be “extraneous” and should not be read into the claim. *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998); *E.I. du Pont de Nemours &*

Co. v. Phillips Petroleum Co., 849 F.2d 1430, 1433 (Fed. Cir. 1988). The Specification, however, does convey that the term “traffic jam” is not used in a layman’s sense, but instead used as a description of a situation arising from a data comparison meeting certain criteria as discussed below.

Contrary to Petitioner’s assertions, the discussion regarding “a jam” in the Background of the Invention is not particularly probative of how that term should be construed in the context of the ’130 patent. The background explains how another patent (U.S. Patent No. 5,699,056 (“the ’056 patent”)) defines a situation as “a jam.” *See* Ex. 1001, 1:38–43. The context makes clear that the ’130 patent distinguishes how it determines a traffic jam as compared to the ’056 patent. *See id.* at 1:43–64. Namely, that the ’056 patent averages vehicle speeds over a block, and the average value may be inaccurate because the speed value of the vehicles may be zero. *Id.* at 1:59–61. Thus, we do not view the discussion of “a jam” in the Background of the Invention with respect to another patent as particularly helpful in determining the scope of the claim term “traffic jam” as to the ’130 patent.

We next examine the claim as a whole, focusing on the disputed language. The claim language itself requires “computational tools for automatic identification of *real time* traffic jam conditions.” Ex. 1001, 19:53–54 (emphasis added). By qualifying the claimed traffic jam as being determined in real time, and by also using “sample vehicles for measuring time delays,” a person of ordinary skill in the art would understand that traffic jams are more immediate, e.g., in real time, than the regular, statistical, congestion described in the ’130 patent. *See* Ex. 2002 ¶ 7 (“[C]laim 1 further goes on to recite the automatic identification of ‘traffic jams,’ by using ‘the sample vehicles for measuring time delays,’ which a

person of ordinary skill in the art would understand must therefore be distinct from regular, statistical, congestion.”). Claim 1 also requires, among other elements, “a receiving device for collecting GPS data at predetermined time intervals moving within the predetermined region,” and “computing individual statistical travel time estimates (regular times) for predetermined roads.” Ex. 1001, 19:41–42, 20:12–13; Tr. 27:16–29:17. Reading the claim as a whole suggests that a “traffic jam” must be *a sudden unpredictable change* of traffic on a segment as compared to these regular times. See Ex. 2002 ¶ 7.

The Specification confirms our interpretation. For example, the Specification describes “a real time vehicle Guidance System is capable of providing optimal route from the present position of a vehicle to a desired target destination when traffic jams may be present.” Ex. 1001, 2:54–57. The Specification also describes “a true real time system” that collects and stores three types of data, including: (1) “temporary changes in road conditions known in advance,” (2) regular predictable changes such as everyday slowdowns in rush hour, and (3) “sudden unpredictable changes such [as] traffic accidents, traffic congestion due to sudden and drastic changes in traffic arrangements.” *Id.* at 3:14–22. The Specification describes “Travel Times Data” as similarly separated into three categories, including a third category of “[s]udden unpredictable changes such [as] traffic accidents, traffic congestion due to sudden and drastic changes in whether [sic] conditions, etc.” *Id.* at 12:9–11. The third category of data is meant to encompass traffic jam situations because the Specification further describes, “[a]s to factors in the third category, it appears that even empirical travel times may be unsuitable for describing *traffic conditions arising from*

sudden and unexpected circumstances which might drastically influence traffic conditions.” Id. at 12:43–47 (emphasis added). As explained in the Specification, “[t]his last feature provides the present invention with truly real time capabilities.” *Id. at 12:54–57.* Based on these descriptions in the Specification, we understand that the term “traffic jam” is used to convey real time traffic conditions arising from sudden and unexpected circumstances tending to influence traffic conditions.

Moreover, the Specification describes using GPS data of vehicles to obtain “Regular Empirical Travel Times,” which are described as times correlated to regular predictable changes for a particular segment, such as everyday slowdowns in rush hour. *Id. at 14:15–33.* The Specification teaches that data from regular travel times may be stored in a central database and attached to sections of roads according to a number of categories, such as type of road or day of the week. *Id. at 14:18–26.* The regular travel time described in the Specification corresponds to the claim limitation of a receiving device for collecting GPS data at predetermined time intervals moving within the predetermined region, and collecting structured GPS data for “computing individual statistical travel time estimates (regular times) for predetermined roads.” *Id. at 19:41–43, 20:12–13.*

The Specification further describes detecting a “bottleneck situation when it arises and to estimate a current travel time for corresponding section of road,” which we determine is used synonymously with “traffic jam.” *Id. at Abstract.* The Specification uses the term “bottleneck” in a similar context to convey situations where sample vehicles have spent considerably more time than “a regular time stored in the database.” *Id.* In one

embodiment for detecting a bottleneck, or traffic jam, a “Current Travel Time” (CTT) is used and compared to the “Regular Travel Time” (RTT) when a time interval is “short enough to consider the detected bottleneck to be current” and when each vehicle “has spent considerably more time” on a segment “than the corresponding RTT.” *Id.* at 14:49–67. Such a situation is “interpreted as a bottleneck” or traffic jam. *Id.*; *Ex. 2002* ¶ 6.

Thus, the Specification consistently equates a traffic jam to situations where sudden and unpredictable changes in traffic conditions result in considerably more time spent in a segment as compared to regular times. Based on the Specification discussed above, and reading claim 1 as a whole, we determine that identification of a “traffic jam” uses measured time delays of sample vehicles, and requires a baseline “regular time” for comparison, to determine whether or not a traffic jam condition exists. As such, we construe “traffic jam,” broadly, but reasonably, as a sudden unpredictable change of traffic in a segment as compared to regular times, i.e., individual statistical travel time estimates.

D. Obviousness Based on TravTek, Sumner, and Roozmond

Petitioner challenges the patentability of claims 1, 3, and 4 of the ’130 patent under 35 U.S.C. § 103 as obvious based on TravTek, Sumner, and Roozmond. Pet. 12–57. Additionally, Petitioner challenges the patentability of claim 2 under 35 U.S.C. § 103(a) as obvious based on TravTek, Sumner, Roozmond, and Booth. *Id.* at 57–62. Petitioner relies on TravTek, Sumner, Roozmond, and Booth in the same manner as the ground based on TravTek, Sumner, and Roozmond. Petitioner identifies

the disclosures in the cited references alleged to describe the subject matter in each of the challenged claims. *Id.* at 12–62.

Patent Owner disagrees that the combination of TravTek, Sumner, and Roozemonnd discloses certain claim limitations. For all challenged claims, Patent Owner relies on arguments it presented with respect to claim 1. PO Resp. 12. Thus, our analysis and reasoning discussed *infra* with respect to claim 1, applies equally to the challenges to claims 2–4, as discussed below.

We have reviewed the provided arguments and supporting evidence of record in this trial. For the reasons given below, we conclude that Petitioner has not demonstrated by a preponderance of the evidence that claims 1, 3, and 4 of the '130 patent would have been obvious based on TravTek, Sumner, and Roozemonnd, and claim 2 would have been obvious based on TravTek, Sumner, Roozemonnd, and Booth. We begin our analysis with a brief summary of these references, and then address the parties' respective contentions in turn.

1. TravTek (Ex. 1004)

TravTek has a date stamp indicating publication in July 1995. Pet. 4; Ex. 1004, 2. Petitioner also provides the Declaration of Lisa Rowlison de Ortiz (Ex. 1023), the Head of Catalog and Metadata Services at University of California-Berkeley Library, as evidence that TravTek was publicly available on January 2, 1997, or earlier. Pet. 4–5 (citing Ex. 1023 ¶¶ 4–10).

TravTek describes a system providing motorists in Orlando, Florida with real-time traffic information and route selection. Ex. 1004, 8, 20, 31.⁴ The “Foreword” of TravTek describes “an advanced driver information and

⁴ For articles cited by Petitioner, we rely on Petitioner's inserted page numbering set forth at the bottom of each page. See 37 C.F.R. § 42.63(d)(2).

traffic management system that provided a combination of traveler information services and route navigation and guidance support to the driver.” *Id.* at 4. “One of the primary objectives of the TravTek system was to provide drivers with routes that minimized their individual travel times to their destinations.” *Id.* at 38. The process incorporates link (road section) travel times broadcast to a Traffic Management Center (TMC) to achieve this objective. *Id.* One of three sources of current link travel time information is the probe vehicle. *Id.* TravTek states that “[l]ink travel time data were received automatically from the probe vehicles, freeway management system, and arterial control management system.” *Id.* at 5 (Form DOT F 1700.7). TravTek explains that “the time required for the TravTek vehicle to travel a link was determined by monitoring the time it crossed the beginning and end of the link.” *Id.* at 88.

“Using information provided by the TMC, software in the vehicle continuously determined the optimum route that minimized the travel time to a destination.” *Id.* at 38. TravTek further discloses that “the double ended search process continued to search for a minimum travel time path . . . until a connected path was formed between the origin and the destination.” *Id.* at 79. In a similar manner, TravTek describes rerouting drivers around areas of congestion and incidents. *Id.* Vehicles in the network would receive once a minute updates of the travel times on links in the TravTek network, such that “the vehicle continuously searched for routes that provided a significant time savings to the driver.” *Id.*

2. Sumner (Ex. 1010)

Sumner describes an in-vehicle traffic congestion system for providing “real-time traffic congestion data to drivers of suitably equipped

vehicles.” Ex. 1010, Abst. Sumner discloses a technique for processing traffic congestion information, and displaying relevant congestion information to the driver related to specific road sections (*id.* at 2:61–65) via a vehicle navigation device (*id.* at 3:5–7). In particular, traffic condition data is gathered and formatted at a central location into a unified form that is useful for the driver in real-time, and transmitted to an in-vehicle receiver, so that the driver can avoid traffic congestion. *Id.* at 3:10–20.

3. Roozemon (*Ex. 1005*)

Roozemon contains a copyright notice indicating it first published in 1997 (Ex. 1005, 1) and “[t]he WorldCat and University of California-Berkeley Library listings for Roozemon confirm the publication date of 1997.” Pet. 5 (citing Exs. 1021 (WorldCat website listing for Roozemon) and 1022 (OskiCat UCB Library Catalog listing for Roozemon)).

Roozemon describes a model of forecasting the travel times of links for dynamic route planning systems. Ex. 1005, 1. Roozemon describes that in order “to forecast properly we use both historic data and current data from monitoring devices as input for our dynamic model.” *Id.* Roozemon describes “combining the best of both worlds” by forecasting “travel times in the near future based largely on current data as well as [forecasting] travel times for some time ahead based on current and historic data.” *Id.* Roozemon further describes using different data as input for travel time calculations based on time spans. *Id.* at 7. Historical data is used for time spans larger than a couple of hours, actuated data for shorter time-spans such as 15 minutes, and a mixed, or fuzzy, decision making process for intermediate cases. *Id.*

Further, Roozmond discusses use of a “rolling horizon approach,” where a forecast “is subdivided into several stages or projection horizons with a limited time span; in each stage, reliable short-term forecasts and not-as-reliable medium- and long-term forecasts of traffic conditions are available when each user enters that stage.” *Id.* Such an approach enables calculation of a more optimal route, according to Roozmond. *Id.*

4. Booth (Ex. 1011)

Booth relates to providing custom travel information using geolocation data and map database information. Ex. 1011, Abstract. Map database information is generated from the movement of vehicles by passively geolocating and tracking at least one vehicle carrying a mobile transmitter, storing the information in a database, and providing custom travel-related information to the vehicle. *Id.*

5. Discussion

a. Claim 1

We previously instructed Patent Owner that “any arguments for patentability not raised in the [Patent Owner Response] will be deemed waived.” Paper 10, 6; *see also* 37 C.F.R. § 42.23(a) (“Any material fact not specifically denied may be considered admitted.”) Additionally, the Board’s Patent Trial Practice Guide states that the Patent Owner Response “should identify all the involved claims that are believed to be patentable and state the basis for that belief.” Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

With the complete trial record before us, we note that we have reviewed arguments and evidence advanced by Petitioner to support its unpatentability contentions where Patent Owner chose not to address certain

limitations in its Patent Owner Response. In this regard, the record now contains persuasive arguments and evidence presented by Petitioner, many of which are unrebutted, regarding the manner in which the asserted prior art teaches corresponding limitations of the claims against which that prior art is asserted. The limitations that Patent Owner contests in the Patent Owner Response are addressed below.

i. “Geographical Zones”

Claim 1 also recites, in relevant part, that the CTU includes “computational tools for dividing said geographical region into a number of smaller geographical zones for reducing volumes of traffic parameter data broadcast to client vehicles.” Ex. 1001, 20:20–23 (“geographical zones limitation”). Petitioner directs our attention to the disclosure in TravTek regarding the presentation of navigation directions on the in-vehicle display “as ‘a **series** of computer generated maps.’” Pet. 36 (citing Ex. 1004, 76). Relying on the testimony of its Declarant, Petitioner argues that one of skill in the art have would understand that “generating the ‘series of **computer generated** maps’ would have included computational tools for dividing the geographical region (Orlando) into the smaller computer generated maps.” *Id.* (citing Ex. 1003 ¶ 87). Petitioner concludes that one of skill in the art would have understood that the volume of traffic parameter data broadcast to the client would be reduced because only data relevant for the local map is transmitted to the vehicles. *Id.* (citing Ex. 1004, 61–63). *See also* Ex. 1003 ¶ 88 (“TravTek’s system aimed to ‘minimize the quantity of data broadcast to the vehicles’ and a POSITA would have recognized that one technique for minimizing the amount of data broadcast to vehicles was by dividing the Orlando geographical region into smaller geographical zones.”)

Petitioner additionally relies on Sumner's disclosure regarding 'an improved traffic congestion information system' that "converts . . . raw traffic congestion data into a uniform congestion message for each congested section or 'link' of highway" which is then 'transmitted to vehicles' which then 'display congestion data provided by the ICI system' over digital road maps on a display screen.

Id. at 37 (citing Ex. 1010, 1:18–22, 3:52–63, 4:3–6, 5:21–33, 6:29–36, 7:51–8:12). Referring to Figure 4 of Sumner, Petitioner asserts that these digital road maps are divided into smaller "cells." *Id.* at 37–38. Petitioner also directs our attention to the passage in Sumner describing how an area is divided into sections, and that "only the congestion area for the cell in which vehicle is located and 'an area encompassing adjacent cells' is broadcast to the vehicles." *Id.* at 38 (citing Ex. 1010, 6:49–67, 13:44–64). Relying on the testimony of its Declarant, Petitioner concludes that the volume of traffic parameter data broadcast to vehicles is reduced as a result of dividing the map data into cells and because congestion data is only transmitted to "adjacent cells." *Id.* (citing Ex. 1003 ¶ 89).

Petitioner proffers multiple reasons why one of skill in the art would divide the geographical region in TravTek's traffic and forecasting navigation system into smaller zones as suggested by Sumner. Pet. 39–41. For example, because such modification would reduce the amount of data communicated to and stored by the vehicle. *Id.* at 39 (citing Ex. 1010, 6:49–67, 13:44–64; Ex. 1003 ¶ 90). Additionally, because the proposed modification would allow the driver to discriminate data within an area and only display or report applicable data. *Id.* at 40 (citing Ex. 1010, 7:35–48; Ex. 1003 ¶ 91). Further, because such modification would involve the

application of a known technique (e.g., dividing a geographic system) to a known system (e.g., TravTek’s navigation system), to yield predictable results. *Id.* (citing Ex. 1003 ¶ 92).

Patent Owner argues that neither TravTek nor Sumner disclose the “geographical zones limitation.” PO Resp. 10–11. According to Patent Owner, TravTek served a small geographic region that was not subdivided for purposes of broadcasting traffic parameters to vehicles within the region. *Id.* at 10–11. Relying on the testimony of Dr. Kurzhanskiy, Patent Owner asserts that TravTek had no geographic subdivision, and instead broadcast the current travel time on every route to the vehicles in the TravTek Network every minute. *Id.* at 11 (citing Ex. 2002 ¶ 17). With respect to Sumner, Patent Owner asserts that Sumner “broadcasts all link data to link data to all vehicles . . . But all of the link data is broadcast to each vehicle: ‘Vehicle processor subsystem 103 receives all link messages for all cells, but processes only those which the driver wishes to display.’” *Id.* (citing Ex. 1010, 7:35–38).

The core issue here is whether the teachings of TravTek and Sumner, taken as a whole, would have suggested the patentee’s invention to a person having ordinary skill in the art. Attacking the teachings of TravTek and Sumner individually does not undermine Petitioner’s showing of obviousness. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981) (nonobviousness cannot be established by attacking prior art teachings individually where the ground of unpatentability is based upon a combination of the prior art teachings).

As Petitioner points out, TravTek discloses

[t]hrough the navigation function, the position of the vehicle on the street network was determined. Once the exact position of the vehicle was determined, *a series of computer-generated maps* of the street network were developed and displayed to the driver on the color video display terminal mounted in the dashboard of the vehicle.

Ex. 1004, 76. We credit the testimony of Dr. Braasch that “[a] POSITA reviewing this and other disclosures of TravTek would have understood that this ‘series of computer generated maps’ of the Orlando area represent smaller geographical zones throughout the Orlando area.” Ex. 1003 ¶ 87. Petitioner presents sufficient argument and credible evidence to support a finding that the series of computer generated maps of the region described by TravTek divides the geographical region into a number of smaller geographical zones.

We also credit the testimony of Dr. Braasch that Sumner’s in-vehicle congestion information system “also divides digital road maps into smaller maps or ‘cells’ to reduce the amount of traffic data that needs to be broadcast to each client vehicle.” Ex. 1003 ¶ 89 (citing Ex. 1010, 6:34–48; 13:19–43; 15:14–21). Indeed, Sumner expressly describes a cell messaging system in which “only congestion information directly related to an individual driver’s location and heading should be provided.” Ex. 1010, 13:13–18. Sumner describes how (1) traffic congestion data and geographic data as combined in a central computer via a data fusion process into congestion data (Ex. 1010, 14:5–7); (2) congestion data is formatted into individual “link” messages that are transmitted to the vehicle database (*id.* at 14:7–11); (3) the vehicle database includes a description of each link and list of link numbers corresponding to each cell number (*id.* at 14:12–14); and (4) the requested traffic congestion data for a cell number is provided (*id.* at

14:14–26). Petitioner presents sufficient argument and credible evidence to support a finding that Sumner’s cell messaging system divides the geographical region into a number of smaller geographical zone and one of skill in the art would understand that displaying individual driver messages “related only to the congestion data which is relevant to that vehicle” (*id.* at 13:16–18) would “reduc[e] volumes of traffic parameter data broadcast to client vehicles” as required by claim 1.

Nonetheless, we recognize that claim 1 is a system claim, which like an apparatus claim, must be distinguished from the prior art in terms of structure rather than function. *See In re Schreiber*, 128 F.3d 1473, 1477–78 (Fed. Cir. 1997). Here, Petitioner argues persuasively that combining the computer generated maps of TrakTek with the link congestion message of Sumner would result in a device capable of performing the recited function—reducing the volume of traffic data broadcast to the vehicle, in support of its contention that Travtek discloses the geographic zones limitation.

ii. “Automatic Identification of Real Time Traffic Jam”

Petitioner argues that the automatic identification of real time traffic jam limitation is satisfied by the disclosure in TravTek with regard to “providing ‘dynamic link travel times and congestion information’” (Pet. 24 (citing Ex. 1004 ¶ 60)); how the current travel time data base “was updated . . . to reflect the status of current travel times (*id.* at 24–25 (citing Ex. 1004 ¶ 61)); and further that “[w]hen incidents or congestion affected the selected routings, drivers were informed and given the opportunity to accept new routings . . . which reflected the changed conditions” (*id.* (citing Ex. 1004 ¶ 22)).

Patent Owner disputes that TravTek discloses the automatic identification of real time traffic jam limitation because the '130 patent identifies a traffic jam based on "an abnormal or atypical slowdown." PO. Resp. 7 (citing Ex. 2002 ¶ 12–13). Patent Owner contends "[t]here is no disclosure in TravTek that compares current road conditions from sample vehicles with a regular travel time in order to determine abnormal congestion, or 'real time traffic jam[s]' recited in claim 1." *Id.* at 8. According to Patent Owner, "TravTek takes current link time from the probe vehicles and continuously computes link time travel ratios," but "[t]hese ratios are computed by comparing the current link time with a 'Free flow link time' in a Dynamic Link Message." *Id.* This Dynamic Link Message is defined as (Current link time) / (Free flow link time). *See* Ex. 1004, 63. Both parties agree the "free flow link time" is based on the speed limit alone. PO Resp. 9; Tr. 11:15–18; 13:7–9. According to Patent Owner and Dr. Kurzhanskiy, TravTek does not teach computing real time traffic jam identification by utilizing sample vehicles for measuring time delays because the comparison of "Current Link Time with Free flow link time, has no concept of what would be normal congestion versus abnormal congestion, that is, a 'traffic jam' as that term is understood in claim 1." Ex. 2002 ¶ 14; PO Resp. 8–9. As argued by Patent Owner, "[a] comparison with free flow link time, which is based on the speed limit alone, is indifferent as between statistically normal and abnormal conditions." PO Resp. 8–9.

Patent Owner points to evidence showing inconsistencies as to whether TravTek is initially capable of calculating routes using historical travel times. Paper 18 (Observations), 1–2. Patent Owner suggests that only the free flow link time based on speed limit is used in the ratio discussed

above. Patent Owner directs us to Dr. Braasch's cross-examination testimony, i.e., "I can't answer the question about the apparent discrepancy' raised between the introduction of TravTek and its disclosure on pages 78–79, which 'discusses only nominal or free-flow times that are used for routing.'" *Id.* (quoting Ex. 2004, 24–25).

Petitioner, in its Reply, first argues that the "computational tools" claim element is non-functional descriptive material that is not entitled to patentable weight because it is untethered from any storage medium or structure. Pet. Reply 9–10. This argument is not persuasive because we consider the claims as a whole, and the computational tools are part of a system that also includes "a receiving device" and "a database." Ex. 1001, 19:34–56.

Petitioner further argues that "TravTek is clear that its system provides '**link travel times** when incidents or **unusual traffic conditions occurred.**'" Pet. Reply 11 (citing Ex. 1004, 20 (emphasis added)). Petitioner contends that

[a] POSITA would have understood that identification of 'link travel times' that represent 'unusual traffic conditions' would require a comparison of the current link travel times with 'usual traffic conditions' represented by TravTek's 'historical data base' of 'link travel times' originally based on speed limit information, but built up to reflect actual measured link travel times 'by a series of travel time runs over major thorough-fares.'

Id. (citing Ex. 1026 ¶¶ 17–18; Ex. 1004, 120–21; 22; 38; 60–61; 94–95; Pet. 23–24). The identification of "unusual traffic conditions" would involve comparing current link travel times determined from probe reports from probe vehicles, to historic link travel times contained in the "Historical data base" of TravTek. *Id.* at 12 (citing Ex. 1004, 20, 88–90, 120–121; Ex. 1026

¶¶ 18, 21). Petitioner cites to the following passages from TravTek for support:

[t]rip assignments for route guidance purposes were derived from an in-vehicle **historical data base** of link travel times that was updated by dynamic link travel times.... When incidents or **congestion affected the selected routings**, drivers were informed and given the opportunity to accept new routings ... which reflected the changed conditions.

Id. at 12 (citing Ex. 1004, 22). Petitioner contends that one of skill in the art “would have understood that in order for the system to determine if ‘congestion affected the selected routing’ and thus provide a ‘new routing[]’ that ‘reflected the changed conditions,’ this would have included a comparison of the currently identified congestion with the link travel times stored in the historical database.” *Id.* at 12 (citing Ex. 1026, ¶¶ 19–20). Conversely, Petitioner argues that there would be no need to switch to a new routing if the identified congestion using real time probe vehicle information is the same as historical, regularly occurring congestion, “because the regularly occurring congestion is already reflected in the estimated travel time based on the historic link travel times.” *Id.* at 13 (citing Ex. 1004, 60–61, 120–121). That the route is changed in response to identified congestion, “indicates that (1) the affected routing is **worse** than regularly occurring traffic congestion, which indicates (2) that the system must have performed a comparison of the real time ‘congestion affect[ing] the selected routing[]’ with the predicted travel time based on historic link travel times. *Id.* (citing Ex. 1004, 60–61, 120–121).

Petitioner further argues that the comparison in TravTek of current travel times to nominal travel times “sometimes identif[ies] atypical traffic congestion.” Pet. 14. According to Petitioner, “TravTek’s comparison of

current travel times to nominal travel times identifies ‘abnormal congestion’ under at least some circumstances” such as certain times of the day when theoretical speeds are utilized. *Id.* (citing Ex. 1001, 11:59–63, 14:1–6). Petitioner views the congestion level displayed in the user vehicle as “representing less than free flow travel times would be a comparison of current link travel times to normal congestion at times of day when the normal congestion is the same as theoretical speeds on the road.” *Id.* at 15 (citing Ex. 1004, 63; Ex. 1026 ¶ 22).

Based on the final record, Petitioner has not provided sufficient arguments or credible evidence establishing that TravTek teaches the automatic identification of real time traffic jam limitation. Specifically, Petitioner has not persuasively shown how TravTek teaches the use of measured time delays of sample vehicles for computing a real time traffic jam. As explained above, the term “traffic jam” means “a sudden unpredictable change of traffic in a segment as compared to regular times, i.e., individual statistical travel time estimates,” thus the claimed “measuring time delays” must also be in relation to regular times. Claim 1 also requires that the automatic identification of real time traffic jam be determined “by utilizing the sample vehicles for measuring time delays.” Petitioner has not directed us to record evidence sufficient to show that TravTek teaches these limitations.

Petitioner’s analysis of TravTek picks and chooses pieces of TravTek, while ignoring its overall structure and operation. For example, with respect to the automatic identification of real time traffic jam limitation, the original Petition is void of any discussion of the data fusion process actually used to determine potential congestion in TravTek. *See* Pet. 24–25; Ex. 1004, 57–

63. Instead, Petitioner relies on the data fusion process as teaching the “regular times” claim limitation. Pet. 30–36. TravTek, however, explains that “[d]ata fusion was the process by which all incoming traffic information was received and evaluated *to derive an estimate* on a minute by minute basis of the link travel times in the system.” Ex. 1004, 57 (emphasis added). Although TravTek teaches routing around areas of congestion, such a function does not inherently teach or suggest the automatic identification of real time traffic jam limitation. Namely, because routing around areas of congestion is not based on a comparison of measured time delays of sample vehicles.

We understand TravTek as disclosing a ratio of (current link time) / (free flow link time) (Ex. 1004, 63) and the data fusion process determines the current link time input to this equation. *Id.* at 57–63. TravTek’s ratio or formula, however, does not *rely upon a time delay measurement derived from sample vehicles*. First, the free flow link time is based on a posted speed limit. *See* Ex. 1004, 58–60, 63; Tr. 11:15–25. Second, the data obtained from a probe vehicle is one of six data sources that might be used in estimating the current link time. *Id.* Each of the six data sources has “an associated score that determined its priority of consideration,” and the score of the data source begins to decay with time. Ex. 1004, 58. TravTek teaches using the data fusion process to determine which of these six data sources should be used in the process. *Id.* at 58–59; *see also* Tr. 11:18–12:5. TravTek describes that “[a]t any point in time, the data source with the maximum score was considered the best estimate and the data from that source was assigned to the link travel time.” *Id.* at 59. The link travel time

ratio (current link time) / (free flow link time) is described as “1 of 32” encoded ratios. Ex. 1004, 63–64 (Table 4).

Thus, the Petition lacks sufficient analysis of this data fusion process as it would relate to the automatic identification of traffic jam limitation as we have construed it. Instead, Petitioner cites the following passage for support: “[t]he vehicle made use of, as well as generated, current (real-time) traffic information. Current traffic conditions were received by the vehicle’s radio receiver each minute. These conditions were displayed through the driver interface, and were used in the routing (and rerouting) calculations.” Pet. 25 (citing Ex. 1004, 76). Petitioner does not explain the relevance of this passage, e.g., how the vehicle probe data would be used in the data fusion process for measuring time delays of vehicles for determining whether a traffic jam condition exists. Petitioner cites to TravTek’s mention of congestion level displays that represent the status of each traffic link (*id.*), but these outputs are based on the ratio that may or may not use vehicle probe data. Regardless, the level of congestion depicted in these displays is not representative of real time delays of sample vehicles compared to regular times, but instead represents a ratio of current link time, which is determined through a data fusion process that may or may not use vehicle probe data, compared to the free flow link time, or posted speed limit. Tr. 11:15–25; Ex. 1004, 63 (“Congestion level displays . . . were determined both by the types of links represented and by the associated ratio.”). Further, we understand the data fusion process as only deriving an estimate of the link travel times in the system. Ex. 1004, 57, 126 (“It selected the travel time source believed to provide the ‘best’ estimate of actual conditions on the link.”).

Regardless, even if vehicle probe data is used in the ratio above (as an input to the numerator “current link time”), it is not used as the claim requires and Petitioner has not shown how probe data from vehicles is compared to a regular. *See* Pet. Reply 11–14; Ex. 1004, 58–63. TravTek describes the use of vehicle probe data as dependent on a “fuzzy logic” process involving “quality of data and aging” and not whether any time delay between vehicles may exist. Ex. 1004, 58 (“[f]uzzy logic . . . deals with ambiguities and vagueness in data”), 59 (“A weight and decay time was assigned to each of the six data source. . . . At any point in time the data source with the maximum score was considered the best estimate and the data from that source was assigned the link travel time.”), 126; *see also* Tr. 38:16–23 (Counsel for Patent Owner arguing “it doesn’t compare the values of those factor,” but instead, “[i]t compares the freshness of those factors . . . if link travel times are available . . . there’s no comparison whatsoever and there’s no use of historical data at all”). As Patent Owner argues, Petitioner has not established how TravTek compares vehicles probe data to regular times to determine time delays. For example, “[t]he link travel times were encoded as 1 of 32 ratios,” and Petitioner has not established how these ratios can represent time delays between vehicles in order to determine whether an unpredictable change in traffic conditions may exist compared to regular times. Thus, based on the evidence cited by Petitioner, we agree with Patent Owner that “[t]here is no disclosure in TravTek that compares current road conditions from sample vehicles with a regular travel time in order to determine abnormal congestion.” PO Resp. 8.

Petitioner also cites TravTek’s use of “historical data” as a basis for teaching the automatic identification of traffic jam limitation. *See, e.g.*, Pet.

Reply 11. We find this position unpersuasive. TravTek notes that historical data is one of the “six different data sources,” and “historical travel times were sometimes the only candidates for input to the data fusion process.” Ex. 1004, 58, 60. Petitioner does not persuasively show how this historical data would meet the automatic identification of traffic jam limitation. Using historical data as the current link time in the ratio above $((\text{Current link time}) / (\text{Free flow link time}))$ would result in a ratio based on historical time divided by the posted speed limit (free flow link time). This single link travel time ratio represents one data point and Petitioner does not explain persuasively how this relates to automatically identifying a real time traffic jam based on measuring time delays of vehicles – there is no way to determine current real time delay using just historical data and there is no direct comparison of this historic data to “current vehicle link probe times” (Pet. Reply 11–12) as argued by Petitioner. As such, Petitioner arguments and evidence do not demonstrate convincingly that historical data could teach the automatic identification of a traffic jam limitation.

For these reasons, Petitioner’s argument and evidence is not sufficient to support a finding that TravTek discloses the automatic identification of real time traffic jam limitation. As such, based on further review of the record, we determine that Petitioner has not presented sufficient arguments and credible evidence to support a finding that the proposed combination of TravTek, Sumner, and Roozmond would render the limitations required by claim 1 as obvious.

b. Dependent Claims 3 and 4

Each of dependent claims 3 and 4 depend directly from claim 1, and recite additional limitations in addition to the automatic identification of real

time traffic jams and geographic zones limitations discussed above. Ex. 1001, 20:45–67. In support of its challenge of claims 3 and 4, Petitioner identifies the disclosures in each of these references alleged to describe the specific subject matter of challenged claims 3 and 4, respectively. Pet. 48–57. As discussed above, Patent Owner did not carry its burden with respect to claim 2 and 3 because of the deficiencies in its arguments for claim 1. See PO Resp. 12 (“Claims 3 and 4 depend from Claim 1 and are patentable over the proposed combination for at least the same reasons as Claim 1.”).

Based on further review of the record, we determine that Petitioner has not presented sufficient arguments and credible evidence to support a finding that the proposed combination of TravTek, Sumner, and Roozemonnd would render the limitations required by claims 3 and 4 as obvious. See Pet. 48–57.

c. Dependent claim 2

Claim 2 depends from independent claim 1 and recites, in pertinent part, “said central traffic unit utilizing wireless telephone technology for determination of location and for communication with MGUs via the communication system.” Ex. 1001, 20:39–41. Petitioner argues that the combination of TravTek, Sumner, Roozemonnd and Booth disclose this limitation. Pet. 57–62. Specifically, that TravTek, Sumner and Roozemonnd disclose all the elements of claim 1 and Booth “provides further details on the conventional practice of using wireless telephone technology to determine location, thereby showing that it would have been known to a POSITA before March 2000.” Pet. 57. Petitioner proffers several reasons why one of skill in the art would further modify the system of TravTek,

Sumner and Roozemonnd using the geolocation technique suggested by Booth. *Id.* at 59–62.

We have reviewed the arguments and evidence advanced by Petitioner to support its unpatentability contentions directed to claim 2. Here, Petitioner does not rely on Booth to resolve the deficiencies in claim 1 of the proposed TravTek, Sumner, and Roozemonnd combination. Thus, having determined above that Petitioner’s arguments and evidence concerning claim 1 are unavailing, we likewise determine that Petitioner has not presented sufficient arguments and credible evidence to support a finding that claim 2 is obvious under 35 U.S.C. § 103(a) over TravTek, Sumner, Roozemonnd and Booth.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has not established by a preponderance of the evidence that Claims 1, 3, and 4 of the ’130 patent are unpatentable under 35 U.S.C. § 103(a) over TravTek, Sumner, and Roozemonnd; nor established that claim 2 of the ’130 patent is unpatentable under 35 U.S.C. § 103(a) over TravTek, Sumner, Roozemonnd and Booth.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–4 of the ’130 patent are not held unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

Case IPR2016-01537

Patent 6,615,130 B2

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