

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

MAKOR ISSUES & RIGHTS LTD.,
Patent Owner.

Case IPR2016-01536
Patent No. 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 (“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 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. Papers 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 both the '130 patent and a related patent:

1. IPR2016-01535 (U.S. Patent No. 6,480,783)
2. IPR2016-01537 (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.

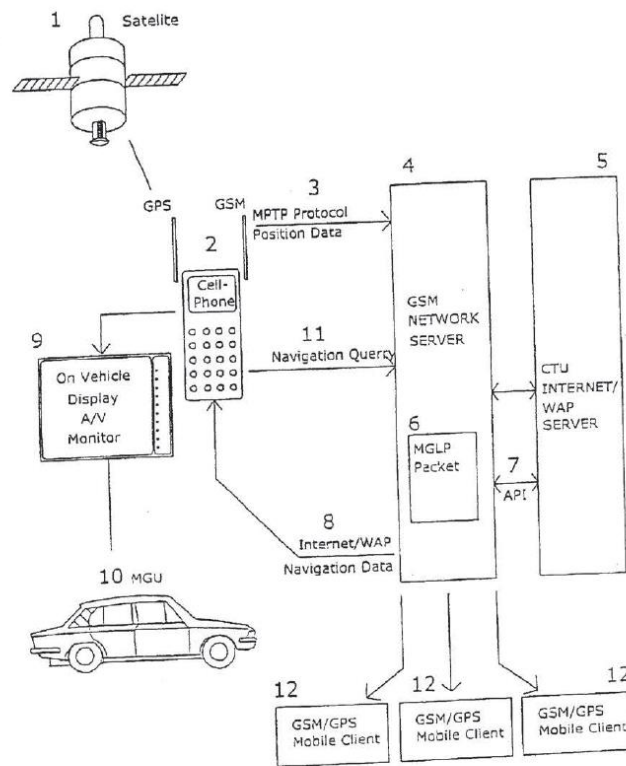


Figure 1 illustrates information exchange in the guidance system.

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 predictable changes in road conditions, and (iii) sudden unpredictable changes in road conditions. Ex. 1001, 11:52–12:11. The stable or 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
Xu	6,401,027 B1	June 4, 2002	1006
Peterson	5,845,227	Dec. 1, 1998	1007
Israni	5,968,109	Oct. 19, 1999	1008
Watters	5,982,324	Nov. 9, 1999	1009

Additionally, Petitioner also relies on the declaration and rebuttal declaration of Michael S. Braasch, Ph.D. (Exs. 1003, 1021) 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. 25):

References	Basis	Claim(s) Challenged
Xu, Peterson, Israni	§ 103(a) ³	1, 3, and 4
Xu, Peterson, Israni, and Watters	§ 103(a)	2

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.

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.

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. 7–8); “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 8); 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 9).

In our Decision on Institution, we determined that express construction of these terms was not necessary. Dec. 10 (citing *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”)).

Patent Owner does not challenge Petitioner’s proposed constructions for these terms in its Patent Owner Response. PO Resp. 4–7. Instead, Patent Owner proposes a construction for “traffic jam” as “an abnormal slowdown or bottleneck – one that is worse than a statistically computed, regular travel time on a section of a route. *Id.* at 4. Petitioner disputes this construction, but does not proffer its own interpretation. Pet. Reply. 1–8; Tr. 10:15–17.

In addition, 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. 10. 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 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 entire record, our determination regarding the obviousness of the challenged claims does not turn on the interpretation of any of the terms or limitations noted above. Thus, based on the final trial record before us, we determine that express construction of these terms is not necessary for purposes of this Final Written Decision.

D. Obviousness Based on Xu, Peterson, and Israni

Petitioner challenges the patentability of claims 1, 3, and 4 of the ’130 patent under 35 U.S.C. § 103 as obvious based on Xu, Peterson, and Israni. Pet. 10–54. Additionally, Petitioner challenges the patentability of claim 2 under 35 U.S.C. § 103(a) as obvious based on Xu, Peterson, Israni, and

Waters. Pet. 55–60. Petitioner relies on Xu, Peterson, Israni and Waters in the same manner as the ground based on Xu, Peterson, and Israni. Petitioner identifies the disclosures in the cited references alleged to describe the subject matter in each of the challenged claims. Pet. 10–60. Petitioner also provides an articulated reasoning with rational underpinning to support its conclusion of obviousness. *Id.*

Patent Owner disagrees, arguing that the combination of Xu, Peterson, and Israni fails to disclose certain claim limitations. For all challenged claims, Patent Owner relies on arguments it presented with respect to claim 1. PO Resp. 19. Thus, our analysis and reasoning discussed *infra* with respect to claim 1, applies equally to the challenges to claims 2–4.

We have reviewed the parties’ contentions and supporting evidence of record in this trial. For the reasons given below, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 3, and 4 would have been obvious based on Xu, Peterson, and Israni, and claim 2 would have been obvious based on Xu, Peterson, Israni, and Watters. We begin our analysis with a brief summary of these references, and then address the parties’ contentions in turn.

1. Xu (Ex. 1006)

Xu “relates to traffic data collection and intelligent routing systems for highway vehicles and, in particular, to a system and method for remotely collecting real-time traffic data and providing traffic forecasts and travel guidance for drivers of vehicles equipped to utilize the system.” Ex. 1006, 1:6–11. The Specification, in particular the Background of the Invention, states that “[t]here are several known methods for collecting traffic data.” *Id.* at 3:23–24. Xu goes on to describe external vehicle sensing systems used

to collect traffic volume and vehicle speed, then Xu states “a method for collecting dynamic traffic data using equipment installed in vehicles is required.” *Id.* at 3:47–48.

Xu describes a traffic data collection system where “[e]ach vehicle **20** is equipped with an in-vehicle device **21** which receives global positioning information data from [GPS] satellites **42**.” *Id.* at 6:31–34. In-vehicle device relays road positions of the vehicle to a traffic service center (TSC). *Id.* at 6:40–45. As depicted in Figure 1 below, “[t]he [TSC] **60** uses the road positions of all vehicles **20** and the information obtained from the external party data sources to provide real-time road traffic conditions for the roadway system **10** and broadcasts the traffic conditions via the communication station **50**.” *Id.* at 6:49–54.

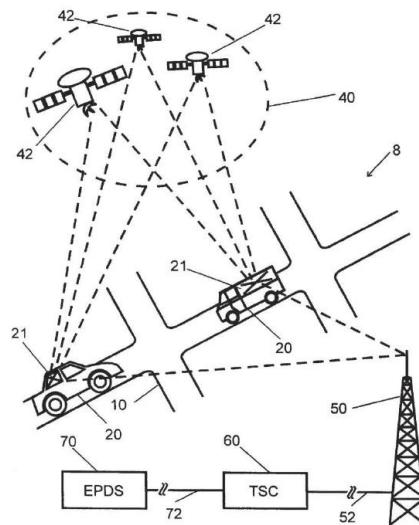


Figure 1

Figure 1 represents a block diagram of the remote traffic data acquisition and intelligent vehicle highway system.

The TSC uses positions of vehicles and information obtained from the external party data sources to provide real-time road traffic conditions to vehicles, which then use the information to provide real-time optimum route

planning. *Id.* at 6:50–60. Xu notes that optimal travel routes may be recommended based on either real-time or forecast traffic conditions. *Id.*

Xu also discloses providing route planning optimization along multiple links of a route. *Id.* at 5:18–26. Xu further describes how abnormal traffic conditions may affect travel forecasts. *Id.* at 12:66–13:6. Xu states that “[i]f there is congestion on a link which is not normally congested and the congestion is completely due to traffic volume, the [TSC] receives a plurality of traffic data indicating that the link is experiencing an unusual congestion, by comparing the current traffic status with the normal traffic condition.” *Id.* Xu then uses the traffic data related to the unusual congestion to adjust the next traffic forecast. *Id.*

2. Peterson (Ex. 1007)

Peterson “provides a method and apparatus for supplying traffic information to users and more particularly to such a method and apparatus for assisting the users in selecting shortest elapsed time routes between various origin and destination combinations.” Ex. 1007, 1:13–17. Peterson enables vehicle tracking and management, ensuring that “routing is up to the minute, dynamic, constantly keeping track of the current traffic and recalculating the user’s route considering all changes.” *Id.* at 1:17–22.

Peterson teaches performing route-calculations at a central computer. *Id.* at 9:64–10:8 (“The central computer calculates the least time route based on giving weight to sensor data in the near horizon and historical in the far horizon.”). Route travel times are estimated using current travel times for the beginning portion of the route and statistical travel times for the remaining portion of the trip. *Id.* Peterson describes that “[g]enerally, the most accurate predictor of elapsed time now is the sensed velocities; two

hours from now the probability based most accurate velocity is one hundred percent historical patterns.” *Id.*

3. Israni (Ex. 1008)

Israni discloses a method and system for storage of geographic data on a physical storage media for use by a navigation application. Ex. 1008, [57]. The geographic data is divided into parcels. *Id.*

4. Watters (Ex. 1009)

Watters relates to combining GPS technology and cellular technology to calculate position. Ex. 1009, Abstract.

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. Based on the preponderance of the evidence before us, we find that Petitioner presents sufficient evidence to support a finding that those limitations are disclosed by the proposed combination of Xu, Peterson, and Israni, arranged as recited in the claims. *See In re Nuvasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016) (“Although the Board did not make findings as to whether any of the other claim limitations . . . are disclosed in the prior art, it did not have to: *NuVasive* did not present arguments about those limitations to the Board.”). The limitations that Patent Owner contests in the Patent Owner Response are addressed below.

i. “Automatic Identification of Real Time Traffic Jam Conditions”

Claim 1 recites in pertinent part “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.” Ex. 1001, 19:53–56 (“automatic identification of real time traffic jam limitation”). Petitioner argues that this limitation is satisfied by the disclosure in Xu of a traffic service center that uses the road position of all vehicles to provide real time road traffic conditions (Pet. 25, (citing Ex. 1006, 6:50–55)) and further that received traffic data is used “to identify congestion on a road or ‘link’” (*id.* at 25–26 (citing Ex. 1006, 12:66–13:6)). To demonstrate that providing real time road traffic conditions was known in the prior art, Petitioner cites the disclosure in Peterson regarding collecting “changing position data” from probe vehicles, and that the central processor “then calculates the route segment or combination of route segments providing a shortest elapsed time route between each origin-destination combination and transmits that information to the respective users.” *Id.* at 27 (citing Ex. 1007, 3:35–50; 4:35–43; 1:13–22). According to Petitioner,

Peterson discloses that “the ‘central computer calculates the least time route based on giving weight to **sensor [real time data] in the near horizon and historical in the far horizon.**’” *Id.* (citing Ex. 1007, 9:48–10:10).

Patent Owner argues that neither Xu nor Peterson discloses the automatic identification of real time traffic jam limitation. PO Resp. 8–16. Xu, in Patent Owner’s view, collects position data in real-time, and uses the gathered position data for *future forecasting* and not identification of traffic jam conditions *in real time*. *Id.* at 8 (citing Ex. 2002 ¶¶ 12–13). Patent Owner directs us to the following passage from Xu, referred to as “the Xu sentence,” asserting that this is the only citation that “can even be construed to suggest that data collected from vehicles may be used for traffic forecasting”:

[t]he traffic service center 60 uses the road positions of all vehicles 20 and the information obtained from the external party data sources to provide real-time road traffic conditions for the roadway system 10 and broadcasts the traffic conditions via the communication station 50.

Id. (citing Ex. 1006, 6:49–54).

The crux of Patent Owner’s argument is that the Xu sentence fails to disclose *how* it actually ‘uses’ the static positions of the vehicle for real-time traffic determination – if indeed the ‘road positions’ are intended to be part of the determination of real-time road traffic conditions, rather than merely a statement of the geographic locus to be used for each vehicle’s report.

Id. at 9 (citing Ex. 2002 ¶¶ 14–15) (emphasis added).

Patent Owner understands the following passage of Xu as teaching that road positions and other sources are utilized in long-term forecasts, and external data for real-time determinations:

An external party interface 64 is provided to connect the external party data sources 70 to receive real-time information about weather or road conditions. The real-time information is processed by an external party data integrator 65 for incorporation into real-time traffic forecasts. The traffic forecasts are computed by a traffic forecaster 68 using the collected vehicle position data for *normal* road conditions.

Id. (citing Ex. 1006, 8:23–30). Taken together, Patent Owner argues that the Xu sentence and this passage teach that vehicle position is used “*only in the longer-term averages* – for normal conditions” and not to calculate immediate congestion. *Id.* at 10 (citing Ex. 2002 ¶¶ 15–16) (emphasis added). Patent Owner contends that other passages in Xu regarding measurements from vehicles teach using this data in calculating average travel time for the link, at a specific time and day, and using this average to predict travel time for the link. *Id.* (citing Ex. 1006, 4:56–5:16). Patent Owner further contends that nothing in Xu teaches the use of “current vehicle GPS positions to determine traffic conditions in real time.” *Id.* at 11. As to the passage in Xu stating that “the traffic service center receives a plurality of traffic data indicating that the link is experiencing an unusual congestion” (Ex. 1006, 13:2–4), Patent Owner argues that this passage “does not at all tie to the positions of the vehicles determined by GPS” (*id.* at 13).

Petitioner, in its Reply, takes the position that Xu discloses the automatic identification of real time traffic jam limitation under both the plain meaning and Patent Owner’s more narrow interpretation of this claim limitation. Pet. Reply 18–19; Ex. 1021 ¶ 24. We note that our analysis and outcome below is the same regardless of the scope of this claim term.

Petitioner responds 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 8–9. This argument is not persuasive because we consider the claims as a whole, and the computational tools are part of the central traffic unit that also includes “a receiving device” and “a database.” Ex. 1001, 19:34–56.

The relevant issue here is whether the teachings of Xu, Peterson, and Israni, taken as a whole, would have suggested the patentee’s invention to a person having ordinary skill in the art. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Attacking Xu and Peterson’s teachings 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). Furthermore, Patent Owner’s arguments are inconsistent with the disclosure of Xu and Peterson.

In this regard, Petitioner directs us to other passages in Xu that, when taken with the Xu sentence, support its position. Pet. Reply 10–15; Tr. 17:22–18:22. For example, Petitioner notes that the abstract of Xu states “[i]n-vehicle devices . . . transmit the **time-related vehicle locations** to a traffic service center” and that “[t]he traffic service center **collects the data from all equipped vehicles** that travel the roadway system in an area within range, process the data and provide a **realtime traffic forecasts** [sic].” *Id.* at 10 (citing Ex. 1006, Abstract). Petitioner also points to a passage in Xu that teaches how the communication system “forwards road traffic data reported from all vehicles 20 traveling the roadway system 10 to the traffic service center” and that this information is used to provide “intelligent route

guidance, such as an optimum travel route based on ***real-time traffic conditions***.” *Id.* at 10–11 (citing Ex. 1006, 7:37-52).

Patent Owner’s assertion that the real-time traffic forecasts of Xu use external data instead of vehicle data, is not supported by Xu’s disclosure. As Petitioner argues, the cited passage specifically indicates that

This portion of Xu states that external party data is ‘***incorporate[ed]*** into real-time traffic forecasts’ not used as the sole basis for real-time traffic forecasts.

Pet. Reply 11 (citing Ex. 1006, 8:23–30); *see also* Ex. 1021 ¶ 17 (Dr. Braasch testifying as to what one of ordinary skill in the art would understand from this passage in Xu). Petitioner supports its position by arguing, like the ’130 patent, Xu uses vehicle time delay information to “determine **both** historic and real-time travel time estimates.” Pet. Reply 12 (*comparing* Ex. 1001, 6:45–56 *with* Ex. 1006, 6:50–60, 7:32–53, Abstract) (citing Ex. 1021 ¶ 22).

Further, Patent Owner’s argument that Xu *only* uses information from third party sources to identify current traffic conditions is not persuasive because it narrowly focuses on one example described in Xu, and fails to consider Xu as a whole, from the perspective of an ordinarily skilled artisan. A prior art reference must be considered for everything it teaches by way of technology and is not limited to the particular example it is describing. *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985). Furthermore, in an obviousness analysis, we must consider the combination of references, as a whole, in light of the general knowledge of an ordinarily skilled artisan. *Merck*, 800 F.2d at 1097.

Here, one stated objective of Xu is to create “a method for collecting dynamic traffic data using equipment installed in vehicles” as opposed to

just relying on the prior art “methods for collecting traffic data” such as “sensing systems” that “are installed along highways,” using “[v]ideo cameras” or “pulsed laser range image technology.” Ex. 1006, 3:23–48. Given that a purpose of Xu was to use dynamic traffic data obtained from GPS receivers installed in vehicles, Xu, as a whole, provides a basis for using that same dynamic traffic data for determination of real time traffic conditions, as testified by Dr. Braasch. *Id.*; *see also id.* at 2:63–67, 4:17–22; Ex. 1026 ¶ 36.

Moreover, Xu explains how current traffic conditions may impact traffic forecasts and “the [TSC] receives a *plurality of traffic data* indicating that the link is experiencing an unusual congestion, by comparing the current traffic status with the normal traffic condition.” Ex. 1006, 12:66–13:6 (emphasis added). We credit the testimony of Dr. Braasch that one of skill in the art reading this passage would have recognized “that these ‘plurality of traffic data’ used to identify real-time ‘unusual congestion’ refers to the sources of traffic data . . . specifically both ‘road positions of all vehicles 20 and the information obtained from the external party data sources’ that are used ‘to provide real-time road traffic conditions for the roadway system.’” Pet. Reply at 12–13 (citations omitted). Indeed, Patent Owner acknowledged during oral argument that vehicle position data would provide a source for real time traffic conditions indicative of unusual congestion, along with other data such as historical “weighting factors.” Tr. 33:7–34:8 (citing Ex. 1006, 12:54–65).

We are persuaded by Petitioner’s argument that one of skill in the art would have understood that:

these ‘plurality of traffic data’ used to identify real-time ‘unusual congestion’ refers to the sources of traffic data previously identified by Xu, specifically both ‘road positions of all vehicles 20 and the information obtained from the external party data sources’ that are used ‘to provide real-time road traffic conditions for the roadway system.’

Pet. Reply 12–13 (citing Ex. 1003 ¶¶ 24, 72; Ex. 1021 ¶¶ 19, 16, 23; Ex. 1006, 12:66–13:6, 6:50–55, 15:15–20, Abstract). As Petitioner points out, Xu recognizes that “current traffic conditions *may also* affect traffic forecasts.” *Id.* at 14 (citing at Ex. 1021 ¶ 20). Also persuasive is the cross-examination testimony of Dr. Kurzhanskiy that “‘Xu discloses that vehicle position data is a form of traffic data that the system collects’ and ‘one of the plurality of traffic data that could be being used to detect unusual congestion is vehicle probe position data.’” Pet. Reply 14 (quoting Ex. 1025, 82:19–83:7).

For these reasons, we are persuaded by Petitioner’s argument and evidence that Xu discloses the automatic identification of real time traffic jams limitation.

As to Peterson, Patent Owner argues that the passages cited by Petitioner utilize vehicle speed data obtained from raw sensor data to determine “estimated elapsed time.” PO Resp. 14 (citing Ex. 1007, 4:35–43, 15:32–49, 4:55–61, 6:45–47, 7:30–44; Ex. 2002 ¶¶ 18–19). Critically, Patent Owner argues that “Peterson can use real-time vehicle *speed* measurements, but not a real-time measurement of *time delays* of sample vehicles” as required by claim 1. PO Resp. 15. That is, Peterson does not base its calculation on time delays of sample vehicles (*id.* at 15 (citing Ex. 2002 ¶¶ 20)) nor detect or distinguish any abnormal slowdown (*id.* at 15 (citing Ex. 2002 ¶¶ 21)).

We are more persuaded by Petitioner’s evidence that Peterson’s teaching regarding the use of changing position data from vehicles to calculate elapsed times “would have been predictably applied to serve as one of Xu’s ‘plurality of traffic data’ sources (which Xu teaches is used to identify the ‘unusual congestion that is ‘due to traffic volume’).” Pet. Reply 15 (citing Ex. 1003 ¶ 73; Ex. 1021 ¶ 27; Ex. 1007, 12:66–13:6). Indeed, Peterson teaches that “velocities, ***or changing position data*** feed back from which elapsed times can be calculated.” *Id.* at 16 (quoting Ex. 1007, 4:35–40). Also persuasive is the cross-examination testimony of Dr. Kurzhanskiy that “Peterson teaches changing vehicle positions as an option for determining current traffic conditions.” *Id.* (citing Ex. 1025, 105:25–106:11). We also credit the testimony of Petitioner’s expert that one of skill in the art “would have recognized that ‘actual times of auto probes’ is equivalent to ‘time delays’ of the vehicles.” *Id.* at 17 (citing Ex. 1021 ¶ 27).

For these reasons, and based on the complete record, we are persuaded by Petitioner’s argument and evidence that Peterson discloses the automatic identification of real time traffic jams limitation.

ii. “Geographical Zones Limitation”

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 Xu regarding “dividing the continental roadway region into ‘digitized road network maps.’” Pet. 38–39 (citing Ex. 1003 ¶ 90; Ex. 1006, 7:6–8:11, 8:18–39, 13:26–30). Again relying on the testimony of its Declarant, Dr.

Braasch, Petitioner argues that one of skill in the art with knowledge of Xu's disclosure regarding transmitting traffic parameter data for the relevant local area would understand that dividing the map into individual maps would reduce the size of the map files transmitted to and stored at the vehicles. *Id.* at 39 (citing Ex. 1003 ¶ 91; Ex. 1006, 7:43–50). Petitioner also points to Peterson and Israni as further support for its position that “dividing a geographical region into a number of smaller geographical zones for purposes of reducing the amount of data to be communicated and stored” is a traditionally known function. *Id.* at 39–40 (citing Ex. 1007, 7:2–12, 3:28–34, Figures 1–3; Ex. 1008, 2:52–58, 10:45–51, 19:29–36).

Patent Owner counters that none of the cited references teach a reduction in the volume of data broadcast to client vehicle. PO Resp. 16–18. Xu, according to Patent Owner, broadcasts the *same* information to all vehicles and does not divide the region in order to reduce traffic data. *Id.* at 17 (citing Ex. 2002 ¶ 23). Peterson and Israni “add nothing to Xu,” in Patent Owner's view. *Id.* at 18. Patent Owner contends (1) that Petitioner fails to explain the relevance of the passages in Peterson it cites concerning data transmission (*id.* (citing Ex. 1007, 7:2–12; 3:28–34; Ex. 2002 ¶ 24)); and (2) that Israni addresses organization of data in a database and not its transmission (*id.* (citing Ex. 2002 ¶ 25)).

Patent Owner's argument, directed to the “reducing volumes of traffic parameter data” portion of the geographical zones limitation does not rebut adequately Petitioner's evidence that the function of dividing the geographic region into zones was known to be included in the route planning system disclosed in the proposed combination of Xu, Peterson, and Israni. Again,

Patent Owner fails to consider the teachings of Xu, Peterson, and Israni as a whole, from the perspective of an ordinarily skilled artisan.

Specifically, its argument that Peterson discloses a centralized architecture, and that one of skill in the art would have been motivated to implement Xu's system using Peterson's centralized architecture because "performing the route calculation at a central computer would have 'alleviated the need to communicate' all available traffic information and other routing information to the vehicles, 'thereby reducing communication and data storage requirements.'" Pet. Reply 21–22 (citing Pet. 17–18; Ex. 1003 ¶ 58; Ex. 1021 ¶¶ 30, 32). Indeed, Xu teaches that dividing the road network map into small blocks would "reduce data volume to be stored in in-vehicle devices." *Id.* at 22 (quoting Ex. 1006, 13:26–30). Petitioner's expert, Dr. Braasch, opines that one of skill in the art "would have recognized reducing the data volume stored at the vehicles would have included reducing the data volume communicated to the vehicles, including the traffic information provided to the vehicles." *Id.* at 22 (citing Ex. 1003 ¶ 90; Ex. 1021 ¶ 33). Petitioner further points to the teaching in Xu that road maps are broadcast to vehicles regionally, and that one of skill in the art "would have recognized that because the digitized road maps are only 'broadcast on a regional basis' that similarly the 'real-time traffic forecast data which are to be broadcast' would also be broadcast on a regional basis because the network maps and realtime traffic forecast data are broadcast together." *Id.* (citing Ex. 1021 ¶ 31).

Based on the full record, Petitioner explains sufficiently how the digitized road network maps disclosed by Xu are capable of achieving the same result of reducing the volume of traffic parameter data broadcast to

vehicles. Pet. 39. Namely, a preponderance of the evidence persuades us that a person of skill in the art “would have understood that dividing the map data into individual local maps would have reduced the volume of traffic parameter data broadcast to the client vehicles because Xu’s system only transmitted traffic parameter data for the relevant local map to the vehicles.” *Id.* (citing Ex. 1003 ¶ 91; Ex. 1006, 7:43–50).

iii. Articulated Reason to Combine Xu, Peterson, and Israni

Patent Owner does not rebut Petitioner’s articulated reasons to combine Xu using Peterson and Israni. *See generally* PO Resp. As discussed above, in addition to Xu, Petitioner relies on Peterson for its teaching regarding performing a computed route search at a central traffic computer, and proffers several reasons why one of skill in the art would incorporate Peterson’s suggestion to calculate a fastest route at a central computing system into the navigation system of Xu. Pet. 16–17. For example, because (1) “performing such calculations at the central computing system would reduce the amount of computing power required at the in-vehicle computers” (*id.* at 17 (citing Ex. 1003 ¶ 57)); (2) the proposed modification would reduce the amount of data communicated to and stored by the in-vehicle computer of Xu (*id.* at 18 (citing Ex. 1003 ¶ 58)); (3) there are only a finite number of locations to perform this type of calculation (*id.* at 18–19 (citing Ex. 1003 ¶ 59)); and (4) because the proposed modification would yield a predictable result (*id.* at 19 (citing Ex. 1003 ¶¶ 60–61)).

Petitioner additionally provides reasons why one of skill in the art would include “speed limit” and “road capacity” information suggested by Israni in Xu’s map database. Pet. 30. For example, because (1) such information “is used ‘to provide useful navigation features to the user of the

navigation system”” (*id.* at 30 (citing Ex. 1003 ¶ 79; Ex. 1008 5:46–66)); (2) such information is beneficial in calculating “optimal travel routes when real time and historic information is not available for particular road segments” (*id.* at 31 (citing Ex. 1003 ¶ 80)); and (3) doing so would be applying a known technique to a known system to yield a predictable result (*id.* at 31–32 (citing Ex. 1003 ¶ 81)).

Finally, Petitioner proffers several reasons why one of skill in the art would modify Xu using the suggestion of Peterson to use current travel time estimates for near zones and statistical travel times for farther zones to calculate the fastest travel routes. *Id.* at 44. These reasons include (1) enhancing the ability of Xu’s system to provide the shortest travel (*id.* at 45 (citing Ex. 1003 ¶ 97; Ex. 1007, 9:64–10:10)); (2) because Xu contemplates using both real time and statistical travel time information to calculate the fastest route and Peterson provides additional details on how to determine the fastest route (*id.* at 45 (citing Ex. 1003 ¶ 98; Ex. 1006, 3:66–4:2, 4:30–38, 5:20–26, 3:66–4:2, 12:66–13:6; Ex. 1007, 9:64–10:10)); and (3) doing so would be applying a known technique to a known system to yield a predictable result (*id.* at 46 (citing Ex. 1003 ¶ 99)).

For the foregoing reasons and based on the complete record, we determine that Petitioner has articulated adequate reasons supported by rational underpinnings to combine Xu, Peterson, and Israni in the manner proposed, as well as established by a preponderance of the evidence that the combination of Xu, Peterson, and Israni would render the limitations required by claim 1 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. 46–55. As discussed above, we conclude that Petitioner has established by a preponderance of the evidence that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination Xu, Peterson and Israni. Patent Owner, however, relies only on its arguments presented with respect to claim 1. See PO Resp. 19 (“Claims 3 and 4 depend from Claim 1 and are patentable over the proposed combination for at least the same reasons as Claim 1.”).

As such, Petitioner’s arguments and evidence demonstrating that the proposed combination of Xu, Peterson and Israni satisfies the limitations of claims 3 and 4 (Pet. 46–55), stand unrebutted. See *generally* PO Resp. Based on further review of the record, we determine that Petitioner presents sufficient arguments and credible evidence to support a finding that the proposed combination of Xu, Peterson, and Israni would render the limitations required by claims 3 and 4 as obvious. See Pet. 46–55.

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 Xu, Peterson, Israni, and Watters discloses this limitation. Pet. 55–60. Specifically, Xu discloses a radio-frequency communication system (*id.* at 55–56 (citing Ex. 1006, 4:25–28)); Peterson discloses a cellular telephone system and the use of wireless technology to determine the location of a vehicle (*id.* at 56 (citing Ex. 1003 ¶ 124; Ex. 1007, 8:35–49, 8:50–60, 11:52–58)); and Watters provides additional details on using wireless telephone technology to determine the location of a mobile device or enhance location determination using other information such as GPS information (*id.* at 56–57 (citing Ex. 1003 ¶¶ 126–129; Ex. 1009, 5:4–13, 27:10–15, 28:30–34, Abstract)). Petitioner proffers several reasons why one of skill in the art would further modify the system of Xu, Peterson, and Israni using the wireless telephone technology for determination of location as suggested by Watters. *Id.* at 57–59.

Patent Owner argues that “nothing in Watters addresses the above-identified infirmities of Ground 1’s combination with respect to Claim 1 of the ’130 Patent. Since Claim 2 depends from Claim 1, it is patentable over the proposed combination for at least the same reasons as discussed above for Claim 1.” PO Resp. 19.

We have reviewed the arguments and evidence advanced by Petitioner to support its unpatentability contentions directed to claim 2. We determine that Petitioner presents sufficient arguments and credible evidence to support a finding that the proposed combination of Xu, Peterson, Israni, and Watters teaches the limitations required by claim 2. Moreover, we find persuasive Petitioner’s articulated reasons to modify Xu’s communication system using Watters’s teachings regarding wireless telephone technology to determine location. Namely, we are persuaded that the one of ordinary skill in the art

would combine the asserted references to overcome shortcomings with each technology individually (*id.* at 57–58 (citing Ex. 1003 ¶ 127; Ex. 1009, 6:30–35)); to address situations when the GPS receiver does not have a “clear view” of enough satellites (*id.* at 58 (citing Ex. 1003 ¶ 128, Ex. 1009, 2:60–67, 2:29–31)); and to do so would be applying a known technique to a known system to yield a predictable result (*id.* at 59 (citing Ex. 1003 ¶ 129; Ex. 1009, 5:4–13)).

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has 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 Xu, Peterson, and Israni; and claim 2 of the ’130 patent is unpatentable under 35 U.S.C. § 103(a) over Xu, Peterson, Israni, and Watters.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–4 of the ’130 patent are 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 IPR2016-01536

Patent 6,615,130 B2

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