

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UBER TECHNOLOGIES, INC. and UBER FREIGHT US LLC,
Petitioners

v.

CARMA TECHNOLOGY LTD.,
Patent Owner

Patent No. 11,164,456

DECLARATION OF PETROS IOANNOU, PH.D.

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i)	[1.pre] A method implemented by at least one processor of a shared transport system, the method comprising:	48
ii)	[11.pre] A shared transport system, comprising:	54
	[11.a.i] a memory storing instructions; and	54
	[11.a.ii] a processor operatively connected to the memory, and configured to execute the instructions to perform operations including:	54
iii)	[19.pre] A non-transitory computer readable medium comprising instructions that are executable by a processor to perform operations including:	56
iv)	[1.a]/[11.a.iii]/[19.a] receiving, from a transport user application operating on a transport user device corresponding to a transport user, a pick-up request for at least one person or item, the pick-up request identifying a pick-up location and a drop-off location for the at least one person or item;	57
v)	[1.b]/[11.b]/[19.b] identifying one or more transport providers available to service the pick-up request, based on information from a transport provider application operating on one or more transport provider devices corresponding to the identified one or more transport providers;	62
vi)	[1.c]/[11.c]/[19.c] transmitting the pick-up request to a transport provider device corresponding to a transport provider, the transport provider being one of the identified one or more transport providers;	66

- vii) [1.d]/[11.d]/[19.d] causing the transport provider device to display, via the transport provider application, one or more of the pick-up location or a transport user rating score associated with the transport user; 69
- viii) [1.e]/[11.e]/[19.e] receiving an indication of an acceptance of the pick-up request;.....71
- ix) [1.f]/[11.f]/[19.f] causing the transport provider device to display, via the transport provider application, at least: 73
- x) [1.g]/[11.g]/[19.g] causing the transport user device to display, via the transport user application:.....75
- xi) [1.h]/[11.h]/[19.h] receiving an indication, based on the GPS position data of the transport provider device, that the transport provider is approaching the pick-up location; 85
- xii) [1.i]/[11.i]/[19.i] in response to receiving the indication that the transport provider is approaching the pick-up location, causing the transport user device, via the transport user application, to display a notification indicative of the approaching transport provider; 86
- xiii) [1.j]/[11.j]/[19.j] receiving, from the transport provider device, an indication that the at least one person or item has been picked up; 87
- xiv) [1.k]/[11.k]/[19.k] causing the transport provider device, via the transport provider application, to display navigation directions to the drop-off location based on the GPS position data of the transport provider device; 88

- xv) [1.l]/[11.l]/[19.l] causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location or the location information of the transport provider based on the GPS position data of the transport provider device; 91
- xvi) [1.m]/[11.m]/[19.m] tracking progress of travel of the transport provider along a route from the pick-up location to the drop-off location based on one or more of the GPS position data of the transport provider device or GPS position data of the transport user device; 92
- xvii) [1.n]/[11.n]/[19.n] receiving an indication that the transport provider has delivered the at least one person or item to the drop-off location from at least one of the transport provider device or the transport user device; 94
- xviii) [1.o]/[11.o]/[19.o] transmitting trip summary data associated with the pick-up request to the transport user device, the trip summary data displayable via the transport user application and including a cost for servicing the pick-up request and a transport provider rating prompt soliciting the transport user to provide a rating value for the transport provider; 95
- xix) [1.p]/[11.p]/[19.p] receiving the rating value for the transport provider from the transport user device via the transport user application; 96
- xx) [1.q]/[11.q]/[19.q] updating the transport provider rating score of the transport provider based on the received rating value for the transport provider; and 97
- xxi) [1.r]/[11.r]/[19.r] causing the cost for servicing the pick-up request to be charged to a payment method associated with the transport user. 99

2.	Claim 2	102
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	ii) the method further comprises:	102
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	i) The method of claim 3, wherein the estimated time associated with arrival of the transport provider at the pick-up location includes one or more of an estimated time of arrival of the transport provider at the pick-up location or an estimated time remaining until arrival of the transport provider at the pick-up location.	105
5.	Claim 5	105
	i) The method of claim 1, further comprising: causing at least one of the transport user device or the transport provider device to display, via the transport user application or the transport provider application, respectively, an interface configured to generate, transmit, and receive messages to and from an other of the at least one of the transport user device or the transport provider device, wherein contact information of the transport user and of the transport provider are anonymized.....	105
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i)	The method of claim 1, further comprising: monitoring the progress of travel of the transport provider along the route from the pick-up location to the drop-off location for anomalies, wherein the shared transport system is configured to transmit an anomaly notification to one or more of the transport user device, the transport provider device, or one or more devices associated with safety personnel in response to detection of an anomaly in the progress of the travel of the transport provider.....	106
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i)	The method of claim 1, further comprising: transmitting a transport user rating prompt to the transport provider device, the transport user rating prompt soliciting the transport provider to provide a rating value for the transport user via the transport provider application;.....	107
ii)	receiving the rating value for the transport user from the transport provider device via the transport provider application; and.....	107
iii)	updating the transport user rating score of the transport user based on the received rating value for the transport user.	107
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i)	The system of claim 11, wherein: the operations further include causing the transport provider device to display, via the transport provider application, an estimated time associated with arrival of the transport provider at the pick-up location; and.....	109

ii)	the estimated time associated with arrival of the transport provider at the pick-up location includes one or more of an estimated time of arrival of the transport provider at the pick-up location or an estimated time remaining until arrival of the transport provider at the pick-up location.	109
10.	Claim 14.....	110
i)	The system of claim 11, wherein the operations further include: causing at least one of the transport user device or the transport provider device to display, via the transport user application or the transport provider application, respectively, an interface configured to generate, transmit, and receive messages to and from an other of the at least one of the transport user device or the transport provider device, wherein contact information of the transport user and of the transport provider are anonymized.....	110
11.	Claim 15.....	110
ii)	The system of claim 11, wherein the operations further include:.....	110
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iii)	updating the transport user rating score of the transport user based on the received rating value for the transport user.	111

X. CONCLUSION.....112

I, Petros Ioannou, declare as follows:

I. INTRODUCTION

1. I have been retained by counsel for Uber Technologies, Inc. and Uber Freight US LLC (“Petitioners”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“PTO”) regarding U.S. Patent No. 11,164,456 (“the ’456 patent”) (EX1001). I have been asked to consider whether a certain prior art combination discloses or suggests the limitations recited in claims 1-5, 7, 10-15, 19, and 20 (“the challenged claims”) of the ’456 patent. My opinions are set forth below.

2. I am being compensated at my rate of \$500 per hour for the time I spend on this matter. My compensation is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other interest in this proceeding.

II. QUALIFICATIONS

3. I have summarized in this section my educational background, career history, publications, and other relevant qualifications. My full curriculum vitae is attached as Exhibit 1003 to this report.

A. Educational Background

4. I received a Bachelor of Science degree in Mechanical Engineering from the University of London (University College) in 1978 with first class honors, a Master of Science degree in Mechanical Engineering from the University of Illinois at Urbana Champaign in 1980 and a PhD degree in Electrical Engineering from University of Illinois at Urbana Champaign in 1982. My PhD thesis was on the topic of Robust Adaptive Control with applications.

B. Career History

5. In 1982 I became an assistant professor in Electrical Engineering and Systems at the University of Southern California (USC), Los Angeles, California. In 1987, I was promoted to associate professor at USC and in 1992 I was promoted to a Full Professor. I have courtesy appointments with the Departments of Aerospace and Mechanical Engineering and Industrial System Engineering and currently hold the A.V. “Bal” Balakrishnan Chair and the prestigious title of University Professor. I am the founder and Director of the Center for Advanced Transportation Technologies, an organized research unit at USC, and I am the co-

founder of the University Transportation Center METRANS at USC where I hold the position of associate research director. I am the founder and Director of the Master Degree program in Financial Engineering at USC and serve as the Director of the Center for Responsible AI in Decision Making in Finance supported by CapitalOne. Starting January 2026, I am the President of the IEEE Intelligent Transportation Systems Society (ITSS). Prior to 2026 I served as President Elect of the IEEE ITSS, Vice President (VP) for Membership, VP for Publications and served as Editor in Chief of the IEEE Transactions on Intelligent Transportation Systems. I have been a member of the National Academy of Engineering since 2022.

6. Vehicle Routing: I have over 30 years of experience in optimization applied to routing of passenger vehicles; trucks carrying and delivering containers; central coordination of schedules and routes of shuttles for airports using connectivity and central computers. My research team and I developed a centrally coordinated truck routing system where trucks send via communication links their origin and destination and desired time window to a central computer system which generates and communicates back their schedules and routes to reduce overall travel time. We also developed a centrally coordinated system for generating schedules and optimum routes for shuttles serving the Los Angeles international airport to reduce congestion at the curbside drop off and pick up points.

7. Intelligent Transportation Systems: These systems use vehicle to vehicle and vehicle to infrastructure communication together with control and optimization techniques to perform lane change control, dynamic speed assignment, ramp metering and traffic light control. These systems involve active communication between vehicles and a central computer system where algorithms and protocols are executed in real time. These technologies involve active communication between users and a central computer system, optimization and decision making without requiring any private information from the users.

C. Publications and Patents

8. I am the author/co-author of 11 books and over 400 publications in Journals and Conference proceedings in the areas of controls, automated vehicles, vehicle routing and intelligent transportation systems.¹ I have close to 40,000 citations with h-index 78 and i10-index 290 on Google Scholar².

9. Some of my representative publications about vehicle routing include:

- Zheyu Wang, Maged Dessouky, Tom Van Woensel, Petros Ioannou, *Pickup and delivery problem with hard time windows considering stochastic and time-dependent travel times*, EURO Journal on Transportation and Logistics, Volume 12, 100099, ISSN 2192-4376.³

¹ <https://pioannou.usc.edu/>

² <https://scholar.google.com/citations?user=lvDGI2UAAAAJ&hl=en>

³ <https://doi.org/10.1016/j.ejtl.2022.100099>

- Aristotelis-Angelos Papadopoulos; Ioannis Kordonis, Maged Dessouky; Petros Ioannou, *Personalized Freight Route Recommendations with System Optimality Considerations: A Utility Learning Approach*, Oct. 2022.⁴
- Ioannis Kordonis, Maged M. Dessouky, and Petros A. Ioannou, *Mechanisms for Cooperative Freight Routing: Incentivizing Individual Participation*, IEEE Transactions on Intelligent Transportation Systems, vol. 21, no. 5, May 2020.
- Jie Shi, Yuanqi Gao, Wei Wang, Nanpeng Yu and Petros Ioannou, *Operating Electric Vehicle Fleet for Ride-Hailing Services with Reinforcement Learning*, IEEE Transactions on Intelligent Transportation Systems, November 2020, Vol. 21, Issue 11, pp. 4822-4834.⁵

10. I also have three issued patents and two pending patent applications in control and transportation.

⁴ <https://doi.org/10.1109/TITS.2022.3213773>

⁵ <https://ieeexplore.ieee.org/document/8878000>

III. SUMMARY OF OPINIONS

11. The opinions contained in this Declaration are based on the documents I reviewed and my professional judgment, as well as my education, experience, and/or knowledge regarding technologies relating to, among other things, transportation systems.

12. In forming my opinions expressed in this Declaration, I reviewed the following materials, as well as any other materials referenced in this Declaration:

Reviewed Materials	
EX1001	U.S. Patent No. 11,164,456 (“the ’456 patent”)
EX1004	Prosecution History of U.S. Patent App. No. 17/236,491
EX1005	UK Patent Application No. GB2397683A to Olmi (“Olmi”)
EX1006	US Pat. App. Pub. No. 2008/0195428A1 to O’Sullivan (“O’Sullivan”)
EX1007	Provisional Application No. 60/900,808 (“’808 Provisional”)
EX1009	US Patent Application No. 12/069,656
EX1010	U.S. Patent Application Publication No. 2003/0040944 to Hileman (“Hileman”)

EX1011	US Patent Application No. 12/924,487
EX1012	US Patent Application No. 15/998,864
EX1013	US Patent Application No. 16/198,000
EX1014	US Patent Application No. 16/698,312
EX1015	US Patent Application No. 16/983,598
EX1030	U.S. Patent Application Publication No. 2001/0037174 to Dickerson (“Dickerson”)
EX1031	U.S. Patent Application Publication No. 2003/0036935 to Nel (“Nel”)
EX1032	International Patent Publication No. WO 2005/104059 A2 to Bhushan (“Bhushan”)
EX1033	U.S. Patent No. 5,799,263 to Culbertson (“Culbertson”)
EX1034	“A distributed geographic information system for the daily car pooling problem,” Roberto Wolfler Calvo et al. Computers & Operations Research 31 (2004) 2263-2278 (“Calvo”)
EX1035	U.S. Patent No. 10,520,325 to Lewinson (“Lewinson”)

13. In support of my opinions, I have taken into account how a person of ordinary skill in the art (as defined below in Section IV) would have understood the claims and the specification of the '456 patent at the time of the alleged invention, which I have been asked to assume is around and no later than April 21, 2021. My opinions reflect how such a skilled person would have understood the '456 patent, the references, and the state of the art at the time of the alleged invention.

14. As I discuss in detail below, it is my opinion that the combination of O'Sullivan and Olmi discloses or suggests all of the limitations of claims 1-5, 7, 10-15, 19, and 20, and that a person of ordinary skill in the art would have had reason to combine the teachings of these references and would have been able to do so with a reasonable expectation of success. (*See* below at Section IX.A.)

IV. PERSON OF ORDINARY SKILL IN THE ART

15. I have been asked to consider the time of the alleged invention for the challenged claims of the '456 patent to be around and up to April 21, 2021. (EX1001 at Cover.) I understand that this is the same date as the filing date of U.S. Patent Application No. 17/236,491, which issued as the '456 patent. (EX1001 at Cover.) Accordingly, I applied this understanding in my analysis herein.

16. Based on my knowledge and experience, I understand what a person of ordinary skill in the art would have known at the time of the alleged invention that I considered above. My opinions herein are, where appropriate, based on my

understanding as to a person of ordinary skill in the art at the time of the alleged invention. In my opinion, based on the materials I have reviewed, and based on my experience in the technical areas relevant to the '456 patent, a person of ordinary skill in the art at the time of the alleged invention of the ' 456 patent would have had at least a bachelor's degree in computer science, computer engineering, software engineering, electrical engineering, or the equivalent and at least two years of experience in technologies relevant to or utilized in transportation systems. More education can substitute for practical experience and vice versa.

17. My opinions in this Declaration, including my analysis of the '456 patent and the references, are from the perspective of a person of ordinary skill in the art, as I defined it above, during the relevant time frame around and up to April 21, 2021. I possessed at least the qualifications of such a person of ordinary skill in the art at that time.

V. TECHNOLOGICAL BACKGROUND

18. In this section, I discuss the state of the art relevant to the subject matter of the '456 patent as would have been known, understood, and appreciated by a person of ordinary skill in the art at the time of the alleged invention for the '456 patent. In particular, a person of ordinary skill in the art would have been aware of various developments in the areas of transportation systems and related processes, as I discuss below. This section is not intended to be technically comprehensive, but rather provide a foundation for the knowledge of a person of ordinary skill in the art at the relevant time. I rely on the following discussions and identified exhibit disclosures to support my opinions in Section IX, as they summarize features that a person of ordinary skill in the art would have been aware of, appreciated, and understood at the time of the alleged invention for the '456 Patent. Accordingly, I incorporate such disclosures and understanding in support of my opinions below concerning the knowledge of such a person or ordinary skill in the art at the relevant time, and how such knowledge and understanding would support my opinions concerning the features disclosed in the prior art and reasons for combining features similar to those disclosed in that prior art in such a manner that, in my opinion, predictably results in a system or method that meets the limitation of the challenged claims of the '456 patent as I discuss below in Section IX.

19. Transportation systems were well known prior to and at the time of the alleged invention of the '456 patent as a means of addressing widespread traffic congestion problems. Traffic congestion was a known problem with wide-ranging consequences, including those related to the transportation of persons and goods.

20. For example, Olmi (EX1005),⁶ which I discuss further below, explains the known critical problems relating to “road traffic congestion.” (EX1005, 3 (§3).) Travel times, parking, road network maintenance costs, pollution, and even traveler stress and related health concerns stemming from traffic congestion are issues that a person of ordinary skill in the art would have appreciated and contemplated when considering mechanisms to address them. (*Id.*, 3 (§3), 8 (§4.4); *see also* EX1030, ¶¶[0005]-[0012] (describing the “very serious concerns” relating to the growing reliance on individual transportation”); EX1010, ¶¶[0002]-[0005]; EX1033, 1:6-61; EX1035, 1:25-55 (describing known traffic and pollution issues caused by single-occupancy vehicles).)

21. Those of ordinary skill in the art would have also understood and been aware of transportation systems and related processes that were designed to address such issues and to improve transportation efficiency of travelers and goods. For

⁶ Citations to EX1005 are to the underlying document page number(s) or Section number(s).

example, as I describe in detail below, Olmi discloses several known transportation systems and related processes that were designed to improve transportation issues known in the art, and improvements Olmi sought to provide to such existing systems and approaches include systems to facilitate carpooling and leverage of existing fixed route transportation network infrastructure. (*See e.g.*, EX1005, 4-9 (§§ 4-5.1), 19 (“seamlessly integrate with existing public transport”), 62-63; *see also* my discussions of Olmi below in Sections VIII and IX.) Other disclosures summarize approaches in transportation systems that were likewise known and appreciated by those of ordinary skill in the art at the time. (*See e.g.*, EX1010, Abstract, ¶¶ [0006]-[0011], [0024]-[0035], FIGS. 1-8; EX1031, ¶¶[0001]-[0016], [0025]-[0027] (describing transportation system for freight hauling); EX1032, Abstract, 1-3 (describing vehicle pooling transportation system processes); EX1033, Abstract, 2:64-5:41, FIGs. 1-5; EX1034, Abstract, 2263-65 (§§ 1-2), 2266-2272 (§§ 3-4.1.1), 2274-2277 (§§ 5-6); EX1035, 1:59-3:22, 3:48-7:29, FIGS. 1A-6.).

22. Use of communication devices in transportation systems was also widely known by those of ordinary skill in the art. (*See, e.g.*, EX1005, 29-32, 40 (§§ 6.2, 7, 7.2), FIGs. 4, 6; EX1010, ¶¶ [0025]-[0027], FIG. 1; EX1031, ¶¶ [0027]-[0029], [0051]-[0052], FIGS. 4A-4B; EX1032, Abstract, 1-5, 8-11, Figure sheets 1-3; EX1033, Abstract, 2:64-5:41, 6:19-8:62, FIGs. 1-5; EX1034, 2267.) Similarly, the use of networked computer systems and servers for managing transportation

system components and processes was known and understood by those of ordinary skill in the art. (*See, e.g.*, EX1005 (§§ 6.2, 7, 7.2), FIGs. 4, 6; EX1010, ¶¶ [0021]-[0028], FIG. 1; EX1031, ¶¶[0030]-[0050], FIGs. 2, 3A-4B; EX1034, 2269-2271 (§§ 3.2-4).)

23. Based on my experience, and from my review of the materials I identify in this Declaration, it is my opinion that a person of ordinary skill in the art at the time of the alleged invention would have been well aware of different transportation systems and processes designed to address known traffic and related issues with the transportation of vehicles, persons, and goods. This includes the use of carpooling and other types of ridesharing applications that leveraged and enhanced existing technologies related to fixed route transportation networks and other ridesharing optimization mechanisms. Given such knowledge and experience, and understanding of the technology underlying such transportation systems and processes, a person of ordinary skill in the art would have had reasons to consider the collective teachings of the prior art I discuss below in Section IX and integrate features and/or functionalities from such disclosures while leveraging their own experience and knowledge of existing transportation systems (consistent with those I discuss above in this section) to configure and provide transportation systems and processes that provide shared transport solutions, and communication protocols, consistent with that in the art at the time.

VI. OVERVIEW OF THE '456 PATENT AND ANALYSIS OF CLAIM LIMITATION SUPPORT

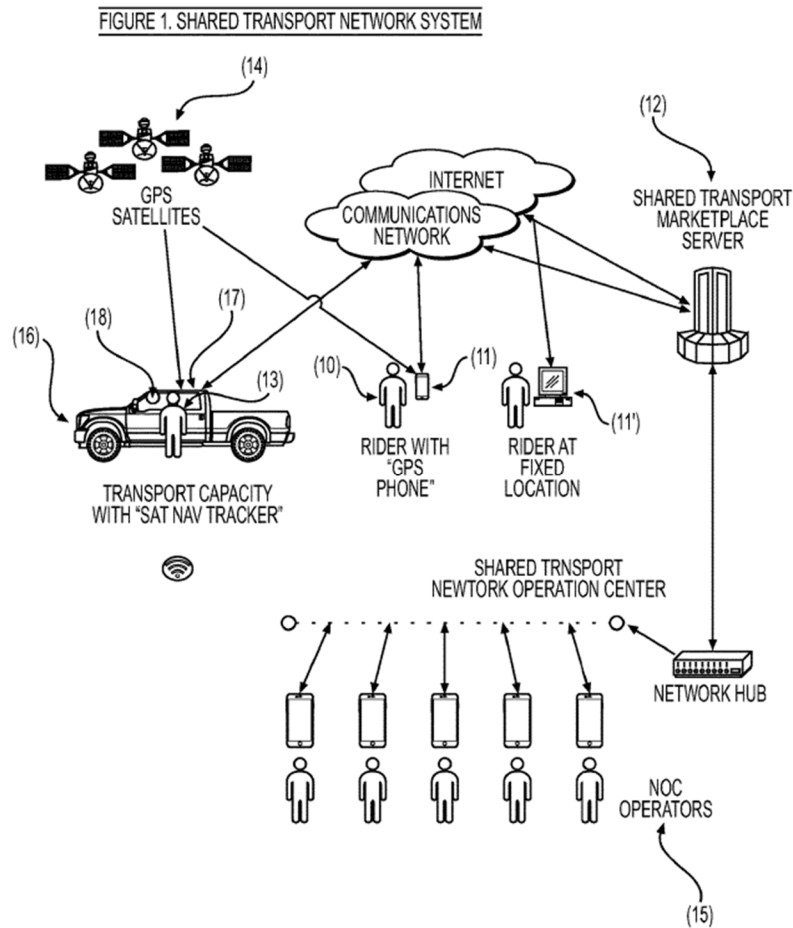
A. Overview of the '456 Patent

24. Based on my review, I understand the '456 patent “relates to a ground transportation network” that, for example, “match[es]” individuals with transport capacity on a supply and demand basis. (EX1001, 1:27-30.) Consistent with my discussions above in Section V, the '456 patent discusses conventional transportation systems, processes, and concepts directed to addressing known transport capacity and demand issues consistent with what would have been known and appreciated by a person of ordinary skill in the art prior to and at the time of the alleged invention for the '456 patent. For example, the '456 patent describes a conventional central assigning system that works in conjunction with vehicle communication devices and employs known dynamic ridesharing and transportation network concepts. (*Id.*, 1:27-3:2.) The '456 patent also describes the use of existing traffic measurement systems, GPS systems, and traffic speed measurement systems (*Id.*, 4:3-4:16), and describes features of current carpooling systems and mass transport systems that give “confidence” to transport users on available capacity (*Id.*, 4:24-38). Thus, the '456 patent acknowledges that implementing existing proposals for dynamic ridesharing systems “*would represent advances over methods in common practice.*” (*Id.*, 1:57-58.)

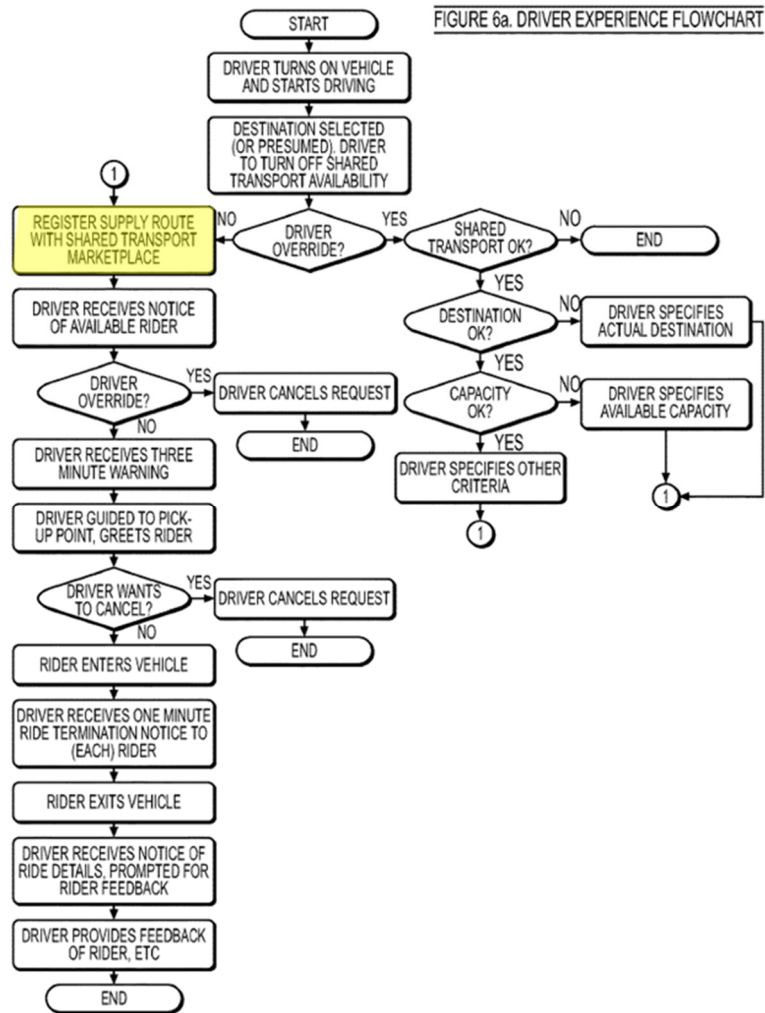
25. However, I understand that the '456 patent expresses a belief that the alleged invention “makes such systems more practical and useful” by purportedly reducing workload and/or steps necessary “to make this system more inconvenient,” improving “trustability,” increasing use, providing a device that communicates “visually” to riders, determining and/or registering transport capacity, and providing information about “ad-hoc” transport capacity “*in manners similar to traditional, centrally controlled transit systems.*”⁷ (*Id.*, 1:56-2:7.)

26. The '456 patent discloses a shared transport system that is a compilation of conventional techniques, concepts, and components, performing known processes for matching riders and drivers in a transportation network. (*See below* §IX.) Indeed, referring to Figure 1, the '456 patent describes a “Shared Transport System” that purportedly “enabl[es] private transport vehicles to serve as an extension of the mass transit system” by matching potential riders with potential drivers. (EX1001, 3:53-55; *id.*, 5:21-22, 7:13-25, FIG. 1 (*below*).)

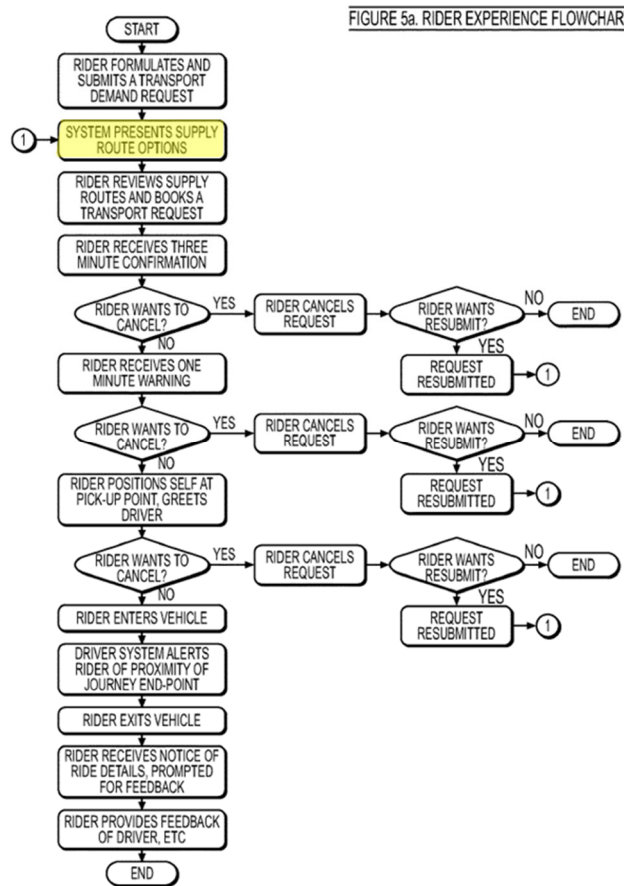
⁷ Unless I have otherwise noted, the emphasis provided in portions of the referenced text is added.



27. The '456 patent discloses that a prospective driver may register a supply route with the Shared Transport Marketplace (shown in yellow in Figure 6a (Driver Experience Flowchart) below), and that a prospective rider is presented with available supply route options (shown in yellow in Figure 5a (Rider Experience Flowchart) below) after submitting a transport demand request. (*Id.*, 22:22-22:40, FIGs. 5a, 6a.)



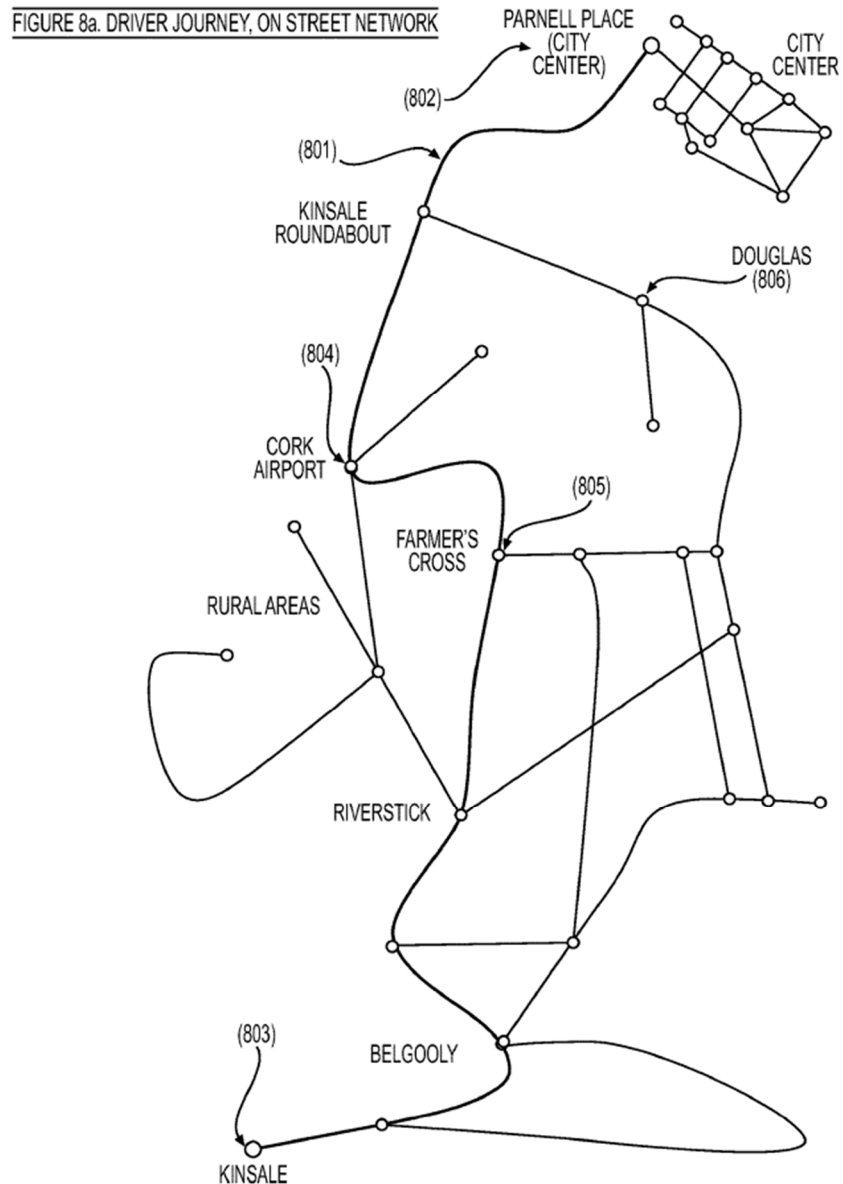
(*Id.*, FIG. 6a (annotated).)



(*Id.*, FIG. 5a (annotated).)

28. The '456 patent discusses features related to known concepts to “convert[] the computer’s representation of a driver’s route into a format which is more usable for further analysis and presentation.” (*Id.*, 14:66-15:2.) The system “can present the journey at the end of the route in the format of a very useful and concise set of major stops, rather than incomprehensible list of addresses of geographic co-ordinates.” (*Id.*, 15:16-15:23.) Figure 8a (below) shows the “route of the driver’s journey,” where the path of the driver’s route 801 is from certain

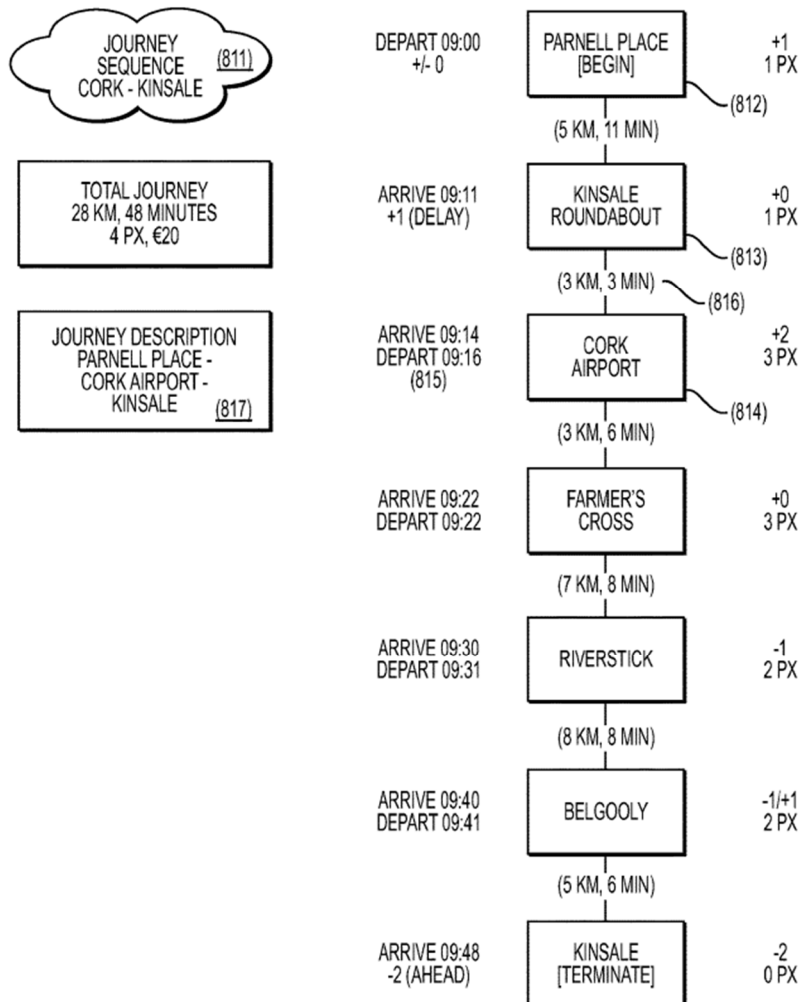
points to others (e.g., “from Parnell Place 803 to Cork Airport 804 to Farmer’s Cross 805”). (*Id.*, 15:16-25.)



29. The '456 patent explains that “once the geographic representation is abstracted to stop nodes, it is possible to show the driver’s route in a variety of alternate presentations, such as the presentation shown in FIG. 8b.” (*Id.*, 15:26-29,

FIG. 8b (below).) Such abstraction encompasses, for example, the presentation shown in Figure 8b below, which includes characterizations of start and end points as names/labels (e.g., place/location (town) names, etc. in boxes below), activity summary (information accompanying boxes below) at intermediate points (stop nodes), and/or a level of characterization. (*Id.*, 15:36-42, FIG. 8b (below).)

FIGURE 8b. DRIVER JOURNEY LOGICAL CHARACTERIZATION



30. The '456 patent explains that, while a city route may have dozens of stops, “perhaps only the most major stops (as coded separately using operator intervention or data entry, for example) would be shown in order to present the information more clearly.” (*Id.*, 15:17-22.) The “major stops of a route, as shown in 817 [of Figure 8b], may not necessarily even include the start or end point.” (*Id.*, 15:34-40; *see also id.*, 15:43-47 (driver journeys “organized as stream of stop nodes”).) Figure 9a “shows the same network model as FIG. 8a, but trimmed to only show those segments and nodes in the network that have active transport capacity on them.” (*Id.*, 15:48-62; *see also id.*, 16:6-13 (“schematization of a shared transport network is shown in Fig. 9b, using the model of the 9a network”).)

FIGURE 9a. ACTIVE NETWORK, GEOGRAPHICAL REPRESENTATION

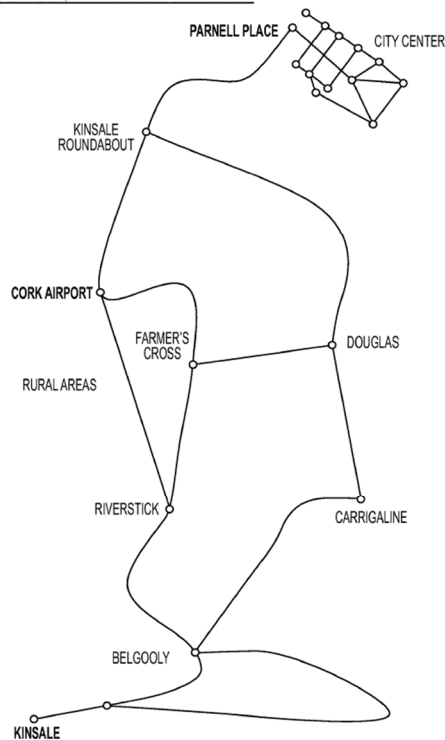
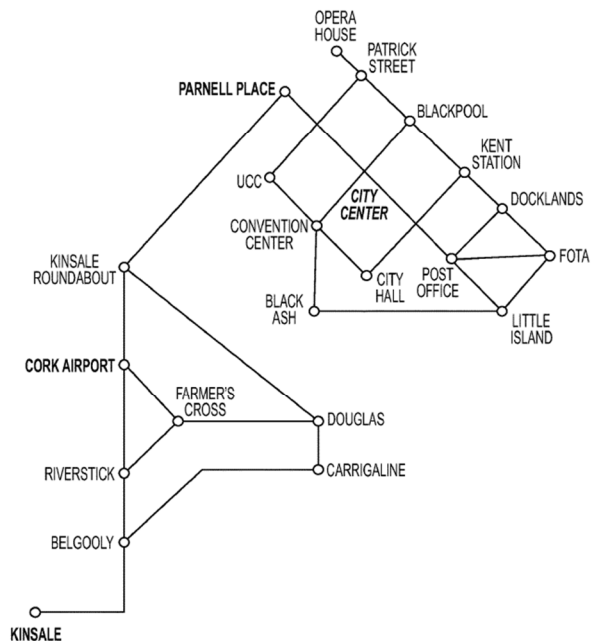


FIGURE 9b. ACTIVE TRANSPORT NETWORK, LOGICAL PRESENTATION



(*Id.*, FIGs. 9a-9b.)

31. The '456 patent explains that “[t]raditional transport networks have known this for a long time, of course, and so maps of network capacity have long been available on public transport systems.” (*Id.*, 15:63-65). And while the '456 patent represents that such features “have not been applied usefully to carpooling systems or...public shared transport,” the patent acknowledges that “[t]raditional public transport networks have also sought to make their transport more understandable by simplifying the geographic maps into quasi-geographic schematic representations that enhance readability and information display” (*id.*, 15:65-16:5), and that “programs and techniques” for generating schematic maps automatically “**are known in academia**” (*id.*, 16:6-11).

32. Moreover, the '456 patent discusses conventional transportation systems/processes/concepts directed to addressing known transport capacity and demand issues. (*Id.*, 1:31-3:2 (conventional central assigning system and associated vehicle communications devices, dynamic ridesharing concepts, transportation networks, etc.), 4:3-16 (discussing existing traffic measurement systems, use of GPS systems, traffic speed measurement systems), 4:28-35 (discussing existing carpooling systems and mass transport systems that give “confidence” to transport users on available capacity).) Likewise, the '456 patent recognizes the prior use of graphical representations and stochastic models for improving user confidence in

shared transport systems. (*Id.*, 15:57-16:11.) The '456 patent further recognizes that journey planners that show the best available route between start and destination points, and cost and schedule information, “are a well-known concept for public transport.” (*Id.*, 20:7-12.)

33. Thus, the '456 patent's alleged invention involves applying known and conventional concepts and techniques (including those already applied by traditional transportation networks) to carpooling and related types of shared transportation applications, which was far from innovative at the time. (*See below* §IX.)

B. Analysis of Support for Certain Claim Limitations

34. I have been asked to consider whether a person of ordinary skill in the art would have understood that the named inventor possessed certain limitations in the claims of the '456 patent as of the filing dates of the earlier-filed patent applications. In my opinion, as I discuss in detail below, a person of ordinary skill in the art would have understood that the named inventor did not possess these claim limitations as of those dates.

35. As shown on its cover page, the '456 patent issued from U.S. App. No. 17/236,491 (“the '491 application”). (EX1001, Cover.) As also shown on its cover page, the '456 patent claims priority to seven patent applications, which I list below:

- Provisional App. No. 60/900,808 (the '808 provisional) (filed February 12, 2007) (EX1007);

- U.S. App. No. 12/069,656 (“the ’656 application”) (filed February 12, 2008) (EX1009);
- U.S. App. No. 12/924,487 (filed September 28, 2010) (EX1011);
- U.S. App. No. 15/998,864 (filed August 17, 2018) (EX1012);
- U.S. App. No. 16/198,000 (filed November 21, 2018) (EX1013);
- U.S. App. No. 16/698,312 (filed November 27, 2019) (EX1014); and
- U.S. App. No. 16/983,598 (filed Aug. 3, 2020) (EX1015).

(EX1001, Cover (“Related U.S. Application Data”); *see also id.*, 1:6-26.)

36. For each claim limitation identified below, I have been asked to evaluate whether, as of the filing date of each of these seven applications, a person of ordinary skill in the art would have understood that the named inventor was in possession of that limitation. In performing this analysis, I considered the entire content of each application, including the specification, claims, and figures. I understand that an inventor may be in possession of a claim limitation even if the application does not recite the limitation verbatim or word-for-word.

37. Below are the claim limitations I was asked to evaluate:

- Claim limitation [1.g.i]/[11.g.i]/[19.g.i]: “causing the transport user device to display, via the transport user application:...a transport provider rating score associated with the transport provider”;

- Claim limitation [1.g.ii]/[11.g.ii]/[19.g.ii]: “causing the transport user device to display, via the transport user application:...an estimated cost associated with servicing the pick-up request”;
- Claim limitation [1.g.iii]/[11.g.iii]/[19.g.iii]: “causing the transport user device to display, via the transport user application:...an estimated time associated with arrival of the at least one person or item at the drop-off location”;
- Claim limitation [1.k]/[11.k]/[19.k]: “causing the transport provider device, via the transport provider application, to display navigation directions to the drop-off location based on the GPS position data of the transport provider device”;
- Claim limitation [1.l]/[11.l]/[19.l]: “causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location”; and
- Claim limitation [1.r]/[11.r]/[19.r]: “causing the cost for servicing the pick-up request to be charged to a payment method associated with the transport user.”⁸

38. In my opinion, as explained below, a person of ordinary skill in the art would have understood that the named inventor did not possess the listed limitations as of the filing dates of the seven applications identified above. My analysis focuses on the '808 provisional (EX1007) and the '656 application (EX1009). Because the as filed disclosures of the other five remaining applications (EX1011 through

⁸ I have underlined claim language throughout my Declaration.

EX1015) are substantively identical to the '656 application, my analysis applies equally to those applications as well.

1. [1.g.i]/[11.g.i]/[19.g.i]: Displaying Transport Provider Rating Score on Transport User's Device

39. First of all, based on the language of the claims, it is my opinion that the “causing” claim limitation [1.g]/[11.g]/[19.g], including subparts [1.g.i]/[11.g.i]/[19.g.i] to [1.g.iv]/[11.g.iv]/[19.g.iv], which concerns the “display” of certain information by “the transport user device,” takes place **after** the “acceptance of the pick-up request” (limitations [1.e]/[11.e]/[19.e]) but **before** “the at least one person or item has been picked up” (limitations [1.j]/[11.j]/[19.j]).

40. For instance, the “causing” limitation (limitations [1.g]/[11.g]/[19.g]) recites “the transport provider” and requires displaying “information” relating to that provider (such as “information descriptive of...a transport provider vehicle associated with the transport provider”) and details of that driver’s transport service (such as “an estimated cost” and “time associated with arrival...at the drop-off location”).

41. The claims subsequently recite features that confirm that this “causing” limitation occurs **after** acceptance of the pick-up request by the driver but **before** the rider is picked up. For example:

- Claim limitation [1.i]/[11.i]/[19.i] recites a separate “causing” step to “display a notification indicative of the **approaching** transport provider” in response to “receiving the indication that the transport provider is approaching the pick-up location.” Therefore, this limitation, which appears after limitation [1.g]/[11.g]/[19.g], describes additional information that is displayed before pick up.
- Limitation [1.j]/[11.j]/[19.j] recites a step to “receiv[e]...an indication that the at least one person or item has been **picked up.**” Therefore, this limitation, which appears after limitation [1.g]/[11.g]/[19.g], describes information that is received by the system when the at least one person or item has been picked up.
- Limitation [1.l]/[11.l]/[19.l] recites another “causing” step to “display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location or the location information of the transport provider based on the GPS position data of the transport provider device.” Therefore, this limitation, which appears after limitation [1.g]/[11.g]/[19.g], describes additional information that is displayed after the driver is picked up.

42. Based on such claim language, it is my opinion that the “causing” claim limitation [1.g]/[11.g]/[19.g] must occur **after** acceptance of the pick-up request by the driver but **before** the rider is picked up.

43. Based on this understanding of the claim language, in my opinion, having read the disclosures of the ’808 provisional and the ’656 application, a person of ordinary skill in the art would have understood that the named inventor did not possess “causing the transport user device to display, via the transport user application:...a transport provider rating score associated with the transport provider” after acceptance of the pick-up request by the driver but before the rider is picked up, as recited in claim limitation [1.g.i]/[11.g.i]/[19.g.i]. Because the as filed disclosures of the other five remaining applications are substantively identical to the ’656 application, my analysis applies equally to those applications as well.

44. In my opinion, the ’656 application provides minimal disclosure of a driver rating score. For example, the ’656 application generally states that the system includes a “rating mechanism” that is “available to riders,” but it does not specify what rating information, if any, is shown to riders or when such information would be displayed:

- “[D]rivers with continually risky behavior are **identified through a real-time rating mechanism available to riders** and the in-car computer measurement system.” (EX1009, 8.)

- “A trust system for managing networks of Transport Providers with varying trust characteristics. As shown in FIG. 7, the **Transport Providers/Drivers are managed by a system 705 which considers their ratings** (as provided to the system by an Activity and Event Manager 702) and their community memberships 713.” (*Id.*, 41.)
- “Providing automated functions for...matching demands, refining **trustability ratings**, optimizing capacity and efficient throughput of the system.” (*Id.*, 48.)

45. Additionally, the '656 application explains that “system **rankings are available**” and that ratings can be used to filter available Transport Capacity. (*Id.*, 19-20.) For example, the '656 application states that “Riders have the ability to only **request Transport Capacity from Drivers with specified quality Star Ratings**, and the like.” (*Id.*)

46. The '656 application also explains that riders may “**rate the Driver**” **at the end of the ride, so after the rider is picked up:**

- “**At the end of each journey**, as the Rider leaves the vehicle, they are messaged with the details and cost of their journey on their GPS phone 11 (via SMS, e-mail, or via a special application or web page, for example). This message also could **prompt the Rider to rate the**

Driver, for example, with 1 to 5 stars, on one or more scales (safety, comfort, social factors).” (*Id.*, 24.)

- Describing **a transport user device**, which may be “**a GPS phone with an ability to display graphics**...enabling Transport User to book travel, receive updates on travel information, confirm bookings and receive activity receipts, provide proof of identity and location, as well as **update trust ratings on providers in the network**”. (*Id.*, 47.)

47. In my opinion, based on those discussions in the '656 application relating to a driver rating score, a person of ordinary skill in the art would have understood that the named inventor did not possess the claimed feature: “causing the transport user device to display, via the transport user application:...a transport provider rating score associated with the transport provider,” as recited in claims 1, 11, and 19.

48. And in fact, if any information is displayed at all, the disclosures discussed above with respect to the '656 application suggest that rating scores may be provided to riders **prior to** selection of a driver so that the riders can avoid risky drivers. In my opinion, the '656 application does not provide any disclosure or suggestion to display such a rating score **at any other time**.

49. In fact, when discussing what is displayed prior to pick up, the '656 application describes only the following: “a message would optimally be sent to [the

Rider]...along with the specific color, model, picture and/or other identifying characteristics of the transport capacity that was arriving.” (*Id.*, 18.) The ’656 application does not disclose that the transport user device, via its user application, would also display the driver’s rating score (“a transport provider rating score”) at this time.

50. In my opinion, the ’808 provisional also does not disclose the claimed feature: “causing the transport user device to display, via the transport user application:...a transport provider rating score associated with the transport provider.” The ’808 provisional generally references a “rating system.” It does not, however, disclose that the rider’s device, via its user application, displays the driver’s rating score (“a transport provider rating score”). (*See, e.g.*, EX1007, 8-9 (“The below system incorporates a security verifying and rating system to provide that the strangers in shared transit systems are trustworthy.”), 15 (“Driver No Show rating”).)

2. [1.g.ii]/[11.g.ii]/[19.g.ii]: Displaying Estimated Cost

51. As I discuss above Section VI.B.1, claim limitation [1.g.i]/[11.g.i]/[19.g.i]), including subpart [1.g.ii]/[11.g.ii]/[19.g.ii], must occur **after** acceptance of the pick-up request by the driver but **before** the rider is picked up. Based on the disclosures of the ’808 provisional and the ’656 application, a person of ordinary skill in the art would have understood that the named inventor

did not possess the claimed feature: “causing the transport user device to display, via the transport user application:...an estimated cost associated with servicing the pick-up request,” as recited in claim limitation [1.g.ii]/[11.g.ii]/[19.g.ii]. Because the as filed disclosures of the other five remaining applications are substantively identical to the '656 application, my analysis applies equally to those applications as well.

52. The '656 application discloses that cost information of the ride may be presented to the rider only **when selecting a driver or after the ride is completed:**

- When selecting a driver: “ The Rider 10, **upon submitting a Demand Route** into the Shared Transport Marketplace 12, **could be presented with a sorted list of the transport options available**, by class of service, type of vehicle, time until Transport Capacity arrives at start-point, estimated transit time to end-point, number of legs in the journey, and **cost.**” (EX1009, 16.)
- “**At the end of each journey, as the Rider leaves the vehicle**, they are messaged with the details and **cost** of their journey on their GPS phone 11 (via SMS, e-mail, or via a special application or web page, for example).” (*Id.*, 24.)

53. These portions of the '656 application do not disclose that cost information is displayed on a transport user device **after** acceptance of the pick-up

request by the driver but **before** the rider is picked up. Nor does any other portion of the '656 application provide such a disclosure.

54. In my opinion, the '808 provisional does not disclose the claimed feature: “causing the transport user device to display, via the transport user application:...an estimated cost associated with servicing the pick-up request,” as recited in claim limitation [1.g.ii]/[11.g.ii]/[19.g.ii]. The '808 provisional's discussion of displaying cost information is similar to the '656 application. The '808 provisional explains that the rider is presented with “a sorted list of the transport options available, by...cost” upon “submitting a Demand Route,” which is before a driver is even selected. (EX1007, 13.) In my opinion, the provisional does not disclose the rider's device, via its application interface, displaying an estimated cost associated with the ride (“an estimated cost associated with servicing the pick-up request”) **after** acceptance of the pick-up request by the driver but **before** the rider is picked up.

3. [1.g.iii]/[11.g.iii]/[19.g.iii]: Displaying Estimated Time Associated with Arrival

55. As I discuss above (§VI.B.1), claim limitations [1.g]/[11.g]/[19.g], including subparts [1.g.iii]/[11.g.iii]/[19.g.iii], must occur **after** acceptance of the pick-up request by the driver but **before** the rider is picked up. In my opinion, a person of ordinary skill in the art would have understood, based on the disclosures

of the '808 provisional and the '656 application, that the named inventor did not possess this claimed feature: “causing the transport user device to display, via the transport user application:...an estimated time associated with arrival of the at least one person or item at the drop-off location,” as recited in claim limitation [1.g.iii]/[11.g.iii]/[19.g.iii]. Because the as filed disclosures of the other five remaining applications are substantively identical to the '656 application, my analysis applies equally to those applications as well.

56. The '656 application describes that the rider “upon submitting a Demand Route....could be presented with a sorted list of the transport options available, by...estimated transit time to end-point.” (EX1009, 16.) Here, assuming an estimated transit time is even displayed (this portion does not state that it is; it instead says the list, which is displayed, is sorted by estimated transit time), the '656 application is describing a process that occurs prior to a driver even being selected. The '656 application does not disclose or suggest displaying an estimated time associated with arrival at the drop-off location **after** acceptance of the pick-up request by the driver but **before** the rider is picked up.

57. The '808 provisional also does not disclose this claimed feature: “causing the transport user device to display, via the transport user application:...an estimated time associated with arrival of the at least one person or item at the drop-off location,” as recited in claim limitation [1.g.iii]/[11.g.iii]/[19.g.iii]. Like the '656

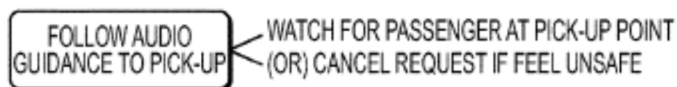
application, the provisional describes presenting “a sorted list of the transport options available, by...estimated transit time to end-point” upon “submitting a Demand Route,” which is prior to a driver even being selected. (EX1007, 13.)

4. [1.k]/[11.k]/[19.k]: Displaying Navigation Directions to Drop-off

58. In my opinion, a person of ordinary skill in the art would have understood, based on the disclosures of the '808 provisional and the '656 application, that the named inventor did not possess the claimed feature: “causing the transport provider device, via the transport provider application, to display navigation directions to the drop-off location based on the GPS position data of the transport provider device,” as recited in claim limitation [1.k]/[11.k]/[19.k]. Because the as filed disclosures of the other five remaining applications are substantively identical to the '656 application, my analysis applies equally to those applications as well.

59. The '656 application briefly describes how the transport provider device may provide navigation to a drop-off location by way of audio guidance instead of visual navigation directions. For example, the '656 application in Figure 6b discloses “follow[ing] **audio guidance** to drop-off.” (EX1009, FIG. 6b.)

FIGURE 6b. DRIVER EXPERIENCE - FUNCTIONAL OPTIONS



(*Id.*, FIG. 6b (excerpted).)

60. While the '656 application explains that the driver's device has "an ability to display graphics," and describe "a personal navigation device or built-in sat-nav unit" to "route the driver to **pick-up locations**," they do not disclose **displaying** navigation directions to a **drop-off location**. (*Id.*, 47.)

61. Therefore, in my opinion, a person of ordinary skill in the art would have understood, based on the disclosures of the '656 application, that the named inventor did not possess the driver's device, via its application interface, "display[ing] navigation directions to the drop-off location based on the GPS position data of the transport provider device."

62. The '808 provisional also does not disclose the claimed feature: "causing the transport provider device, via the transport provider application, to display navigation directions to the drop-off location based on the GPS position data of the transport provider device," as recited in claim limitation [1.k]/[11.k]/[19.k]. Like the '656 application, the provisional application only describes "**audio** guidance to drop-off." (EX1007, FIG. 6.)

5. [1.l]/[11.l]/[19.l]: Displaying on Transport User's Device Time until Arrival

63. Claim limitation [1.l]/[11.l]/[19.l] recites “causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location.” Consistent with my discussion in Section VI.B.1 that the '456 patent claims articulate a sequence, this “causing” limitation must occur **after** “the at least one person or item has been picked up” (limitation [1.j]/[11.j]/[19.j]) but **before** “the transport provider has delivered the at least one person or item to the drop-off location” (limitation [1.n]/[11.n]/[19.n]). In other words, this “causing” limitation [1.l]/[11.l]/[19.l] must occur **during the ride**.

64. For example, as I discuss in Section VI.B.1 with respect to claim limitation [1.g]/[11.g]/[19.g], the claims previously recite “causing the transport user device to display, via the transport user application:...an estimated time associated with arrival of the at least one person or item at the drop-off location” **after** acceptance of the pick-up request by the driver but **before** the rider is picked up. Additionally, referring to claim limitation [1.j]/[11.j]/[19.j], the claims previously recite “receiving...an indication that the at least one person or item has been picked up.” Based on these prior limitations, the “causing” limitation of [1.l]/[11.l]/[19.l] corresponds to the point in time after the rider is picked up.

65. The subsequent claim limitations indicate that this “causing” limitation of [1.l]/[11.l]/[19.l] is also before the rider is dropped off. For example, the next limitation, limitation [1.m]/[11.m]/[19.m], recites “tracking progress of travel of the transport provider,” and limitation [1.n]/[11.n]/[19.n] recites “receiving an indication that the transport provider has delivered the at least one person or item to the drop-off.”

66. Therefore, the “causing” limitation of [1.l]/[11.l]/[19.l] corresponds to the point in time after the rider is picked up but before drop off (i.e., **during the ride**).

67. Based on this understanding of the claim language, a person of ordinary skill in the art would have understood, having read the '808 provisional and the '656 application, that the named inventor did not possess the claimed feature: “causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location” during the ride. Because the as filed disclosures of the other five remaining applications are substantively identical to the '656 application, my analysis applies equally to those applications as well.

68. For example, at most, the '656 application discloses presenting the rider with “transport options available...**estimated transit time to end-point,**” but this process occurs upon the rider submitting a demand route, not during the ride.

(EX1009, 16.) The '656 application also discloses that the rider's device is capable of displaying graphics, "enabling Transport User to book travel, receive updates on travel information, confirm bookings and receive activity receipts, provide proof of identity and location, as well as update trust ratings on providers in the network."

(*Id.*, 47.) In my opinion, based on such portions of the application, a person of ordinary skill in the art would have understood that the named inventor did not possess the claimed feature: "causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location" during the ride.

69. The '808 provisional also does not disclose the claimed feature: "causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location" during the ride. Similar to the '656 application, the provisional application discloses, **upon submitting a request**, presenting the rider with transport options, along with "estimated transit time to end-point." (EX1007, 13.)

6. [1.r]/[11.r]/[19.r]: Charging Cost to Payment Method for Servicing Pick-up Request

70. In my opinion, a person of ordinary skill in the art would have understood, based on the disclosures of the '808 provisional and the '656

application, that the named inventor did not possess the claimed feature: “causing the cost for servicing the pick-up request to be charged to a payment method associated with the transport user,” as recited in claim limitation [1.r]/[11.r]/[19.r]. Because the as filed disclosures of the other five remaining applications are substantively identical to the '656 application, my analysis applies equally to those applications as well.

71. The '656 application discloses that “[a]t the end of this journey, a message would be send to Rider with the details and any billing information about the journey.” (EX1009, 22.) The application also describes “providing...cashless transaction benefit to users of both public transport and shared transport.” (*Id.*, 54.) The '656 application does not state that this information/feature, or any other information/feature, is used to cause a payment method to be charged. Nor does it state how such a charge would be accomplished. Accordingly, in my opinion, based on such a generic discussion about providing a message with billing information and/or cashless transaction benefit, a person of ordinary skill in the art would have understood that the named inventor did not possess claim limitation [1.r]/[11.r]/[19.r].

72. The '808 provisional also does not disclose the claimed feature: “causing the cost for servicing the pick-up request to be charged to a payment method associated with the transport user,” as recited in claim limitation

[1.r]/[11.r]/[19.r]. For example, while the '808 provisional discloses “pricing for a route would be determined by per mile default rates, the number of seats occupied and other preset fixed and variable charges,” like the '656 application, it does not disclose charging the cost to a payment method. (EX1007, 12.)

VII. CLAIM CONSTRUCTION

73. I understand that terms of the challenged claims should be interpreted as would have been understood by a person of ordinary skill in the art, at the time of the alleged invention, taking into consideration the language of the claims, the specification, and the prosecution history of the '456 patent at the time of the alleged invention (around and up to April 21, 2021). I have applied these understandings of the claim terms in my analysis and in forming my opinions where appropriate in this Declaration.

74. I also have been asked to provide my opinions regarding the challenged claims of the '456 patent and the prior art discussed in this Declaration under the following constructions for the following claim terms, which I understand are proposed by Petitioners, as indicated in the table below. I applied those meanings as presented in support of my opinions as requested. My opinions below regarding the challenged claims also demonstrate how the claimed features are disclosed and/or suggested even if no such express constructions are applied.

'456 Patent Term	Petitioners' Constructions
"shared transport system" (all claims)	"A server system that matches transport users with transport providers traveling an existing route defined before demand for transport and independently of a transport user's door-to-door trip."
"pick-up location" / "drop-off location" (all claims)	"A node along an existing route defined before demand for transport and independently of a transport user's door-to-door trip."
"transport provider" (all claims)	"A driver offering transport along an existing route defined before demand for transport and independently of a transport user's door-to-door trip."

VIII. OVERVIEW OF THE REFERENCES⁹

A. Overview of O’Sullivan (EX1006)

75. O’Sullivan (U.S. Pat. App. Pub. No. 2008/0195428) is the publication of the ’656 application, now U.S. Pat. No. 7,940,427 (“the ’427 patent”), the earliest parent of the ’456 patent. Because the ’427 and ’456 patents are part of the same chain of continuations, O’Sullivan (the published application corresponding to the ’427 patent) has the same disclosure as the ’456 patent, and discloses all limitations of the challenged claims except those discussed in Section VI.B, which I conclude the named inventor did not possess as of the filing date of the ’656 application.

B. Overview of Olmi (EX1005)

76. Olmi published on July 28, 2004. Olmi discloses a method/system that, like the ’456 patent, leverages existing features/concepts from public transport and individual transport applications to address transportation problems. (EX1005, 8-9 (§5.1).)¹⁰ Olmi teaches a transportation sharing process where a central computer

⁹ These summaries of the references in Section VIII are applicable to my analysis below in Section IX. Accordingly, I incorporate these summaries, which reflect how a person of ordinary skill in the art would have understood the references, into my analysis below where discussing the disclosures and suggestions as appropriate.

¹⁰ Citations to EX1005 are to the underlying document page number(s).

system analyzes “submitted itinerary requirements that it receives, and then intelligently groups travellers with compatible itineraries onto the same...transit vehicle” (*id.*, Abstract) to address problems with inefficient use of transportation services, among other things, in existing transportation networks (*id.*, 2-7 (“present invention is the breakthrough solution to transport problems and traffic congestion” by providing a “minimal impact system, which easily coexists with other forms of transport, and other traffic control schemes” while “maintaining people-mobility”), 4-7 (§§4.1-4.4).)

77. One configuration that Olmi describes relates to carpooling transport. (*Id.*, 8.) The carpooling configuration matches prospective passengers with carpool drivers having compatible itineraries involving fixed journeys. (*Id.*) An itinerary is a data structure that specifies a travel plan (e.g., embarkation and disembarkation points, but can include multiple destination points, routing requirements, etc.). (*Id.*, 11-12, 32-35.)

78. Olmi explains that both carpool drivers with personal fixed itineraries and potential passengers are considered travellers, i.e., a person with a journey itinerary. (*Id.*, 11.) Travellers (both drivers and passengers) submit their predetermined personal itineraries to the central computer system by submitting a “journey request,” which is a data structure or a computer data format which includes a specification of a traveller or passenger itinerary,” as well as “other travel

requirements relating to this itinerary.” (*Id.*, 12.) Prospective travellers define their predetermined personal itineraries by using a communicator device to send their journey requests to a central controlling computer system, which stores journey requests in a “journey requests database.” (*Id.*, 32.) Olmi also explains that “[m]athematically speaking, using the terminology of graph theory,” each traveller/passenger itinerary “can be encoded as a directed graph whose vertices are the embarkation and disembarkation points of the itinerary, and whose direct edges indicate the direction of travel.” (*Id.*, 11.)

79. Olmi explains that a vehicle can have a vehicle itinerary, which is a data structure that specifies the travel plan of the vehicle and comprises a “set of prescribed geographic points or addresses to which the vehicle must navigate in a prescribed order” and may include a “specification of the road route that will enable the vehicle to reach the said geographic points or addresses.” (*Id.* 11-12.) “Typically these geographic points [of the vehicle itinerary] will be traveller embarkation and destination points,” e.g., pick-up and drop-off points for passengers of the vehicle, as well as points corresponding to “additional stops en route.” (*Id.*, 12). Similar to traveller itineraries, each vehicle itinerary “can be encoded as a directed graph whose vertices are the said geographic points or addresses, and whose direct edges indicate the direction of travel between these geographic points or addresses.” (*Id.*)

80. For example, carpool drivers may have a “car pool intended itinerary specification,” which “include[s] details of the vehicle itinerary that the car pool driver intends to follow,” as well as “related information such as the number of available passenger seats in the car pool vehicle.” (*Id.*, 12.) A carpool driver may use a communicator device in their vehicle to “submit his car pool intended itinerary specification...to the controlling computer system.” (*Id.*, 35; *see also id.*, 15, 32, 40.) The vehicle itineraries are stored in a “transit vehicle current itineraries database,” which contains transit vehicle records for currently operational transit vehicles, i.e., “a vehicle that is currently conveying travellers, or a vehicle that is currently empty but is ready to convey travellers.” (*Id.*, 34.) Carpool intended itinerary specifications are also “entered in the journey request database as a journey request record, with a relational link set up from this transit vehicle record to this journey request record...because [the carpool driver] is also a traveller, and his personal itinerary forms part of the itinerary commitments of his vehicle.” (*Id.*, 35.)

81. Olmi also describes intelligent grouping processes that match vehicles/drivers having a predetermined vehicle journey with a traveller having a compatible journey itinerary and facilitating the transportation of the traveller along the vehicle’s journey route. (*Id.*, 15-20 (§§5.5-5.6), 21-27 (§5.7), 35-39.)

82. For example, Olmi describes matching prospective travellers/passengers from the journey request database with available carpool

drivers from the transit vehicle current itineraries database. (*Id.*, 35-39.) Olmi also describes other features/components, including a digitised street layout map, communicator devices, controlling computer, positions/navigation systems, and a data transmission system. (*Id.*, 12-15 (§§5.3-5.4).)

IX. THE PRIOR ART DISCLOSES OR SUGGESTS ALL OF THE LIMITATIONS OF THE CHALLENGED CLAIMS

A. The Combination of O’Sullivan and Olmi Discloses or Suggests the Limitations of Claims 1-5, 7, 10-15, 19, and 20

84. In my opinion, the combination of O’Sullivan and Olmi discloses and/or suggests all of the limitations of claims 1-5, 7, 10-15, 19, and 20. Below, I address each limitation of the claims.

1. Claims 1, 11, and 19

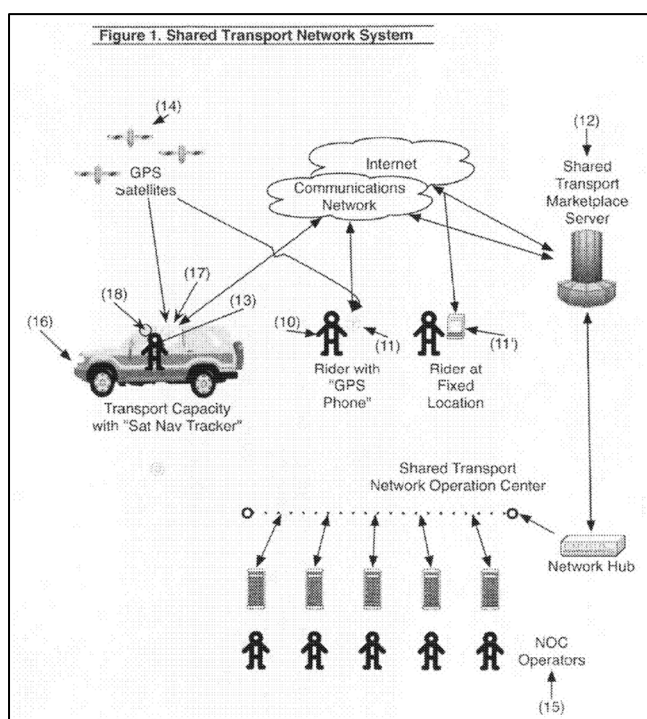
i) [1.pre] A method implemented by at least one processor of a shared transport system, the method comprising:

85. I have been asked to assume the preamble of claim 1 is limiting. Under that assumption, it is my opinion that O’Sullivan discloses the limitations therein.

86. O’Sullivan discloses a “network system” (“shared transport system”) that “matches the supply and demand of transportation services by incorporating unused transportation capacity...with a real-time allocation and matching service that enables individuals and goods to conveniently hire that capacity with attractive pricing, rapid responsiveness, better information availability and trusted security.” (EX1006, [0014]; *see also id.*, [0002], [0015], [0016] (referring to “the network system” as “Shared Transport System”).)

87. As shown in Figure 1, O’Sullivan also discloses that the network system allows “a person 10” (rider), via “a personal communications device 11,” to

send a ride request to a “Shared Transport Marketplace” 12, specifying “a particular start-point (‘Pick-up Point’) and endpoint (‘Destination Point’[]),” which O’Sullivan refers to as the “Demand Route.” (EX1006, [0060].) O’Sullivan explains that device 11 can be “equipped with location information (‘GPS Phone’)” and includes a “Rider Software Interface.” (*Id.*)



EX1006, FIG. 1.

88. Furthermore, according to O’Sullivan, a driver 13 may have a vehicle with “Transport Capacity” for providing “transportation services.” (EX1006, [0062]-[0063].) The vehicle may be equipped with a “navigation device, typically using GPS or other location finding technology, with built-in or external data communication capability, typically using cellular phone or wide area wireless data

networks ('Sat Nav Tracker'), running a software layer with a Shared Transport interface ('Driver Software Interface')." (*Id.*)

89. O'Sullivan explains that a driver's transport capacity is registered with the system when the driver "starts the vehicle," where the driver's route is predetermined, i.e., the driver's route is determined before the rider's demand for transportation service. For instance, O'Sullivan discloses:

When a driver starts the vehicle ("Driver" 13), a **Driver Software Interface automatically determines if the Driver 13 is engaged in a traditional route ("Supply Route"), and registers the transport capacity of the Driver 13 ("Transport Capacity") with the Shared Transport Marketplace 12.** Alternatively, if the Driver is not engaged in a traditional route, the driver is prompted for their destination, or possibly is shown a list of riders possibly headed in the same general (or likely) direction as the Driver, for the Driver to consider sharing, if the Driver's destination is not known. This Transport Capacity would be then registered with the Shared Transport Marketplace 12.

(*Id.*, [0063].) O'Sullivan further explains that shared transport marketplace 12 "provides to the Rider 10 and to the Driver 13 information about Transport Capacity and Transport Demand." (*Id.*, [0064].)

90. It is my opinion that O’Sullivan’s system, discussed above, discloses a “shared transport system” under the Petitioners’ proposed construction I was asked to consider. (*See* my discussion above in Section VII). (*See also* my discussions below Section IX.A.1(v) (my discussions relating to Petitioners’ proposed construction of “transport provider” that I was asked to consider).)¹¹ For instance, for the reasons explained above and those summarized below, O’Sullivan’s system includes:

¹¹ I have been informed that, in district court, Patent Owner (PO) disagrees with Petitioners’ proposed construction of the claimed “shared transport system” that I was asked to consider. I was also asked to consider O’Sullivan (and further as modified in view of Olmi as I discuss below) under the assumption that Petitioners’ proposed construction is not applied to the claim term. Under that assumption, my opinions do not change as O’Sullivan, including as modified herein, still discloses a “shared transport system” under any reasonable interpretation of the term consistent with the language of the claims of the ’456 patent, its specification, and from my review of the prosecution history for the ’456 patent (EX1004), for the same reasons that I explain herein. Meaning, the O’Sullivan system and method (including as modified in light of Olmi) still discloses the claimed “shared transport system” in a manner consistent with the ’456 patent.

“shared transport system”

“A server system that matches transport users [rider(s)] with transport providers [driver(s)]”: For example, O’Sullivan discloses “a network system that matches the supply and demand of transportation services.” (EX1006, [0014].) O’Sullivan also discloses, with respect to Figure 7, “the Shared Transport Marketplace will be composed of a number of computer servers networked together.” (*Id.*, [0156], FIG. 7; *see also id.*, [0080]-[0081], [0165]; *see also below for further discussions.*)

“traveling an existing route defined before demand for transport and independently of a transport user’s door-to-door trip”: The available routes supplied by the driver(s) are existing routes defined prior to a rider’s transportation request and independently of a rider’s door-to-door trip. For instance, as discussed in Section VI.A, O’Sullivan explains that the Driver registers a “Supply Route” along which to travel independent of and before receiving any notice of an available rider. (*Id.*, [0063] (“When a driver starts the vehicle (‘Driver’ 13), a Driver Software Interface automatically determines if the Driver 13 is engaged in a traditional route (‘**Supply Route**’), and registers the

<u>“shared transport system”</u>
transport capacity of the Driver 13 (‘Transport Capacity’) with the Shared Transport Marketplace 12.”); see also my discussions above in Section VII.)

91. Additionally, in my opinion, the above-discussed processes/operations of O’Sullivan’s shared transport service (the claimed “method”) are “implemented by at least one processor” of its system. For example, O’Sullivan discloses that “[t]he network system incorporates...**computing technology** to match the supply of excess transport capacity with the demand for personal transport.” (EX1006, [0015].) In fact, as discussed in O’Sullivan, shared transport marketplace 12 includes “**computer servers**...to perform the data and communications functions as specified.” (*Id.*, [0156], FIG. 7; *see also id.*, [0080]-[0081].) O’Sullivan also explains that shared transit marketplace server includes:

A network of computers attached to the Internet and telecommunications services. **Providing automated functions** for the Network Operations Center, Transport Users and Transport Providers, including matching demands, refining trustability ratings, optimizing capacity and efficient throughput of the system.

(*Id.*, [0165]-[0166]; *see also id.*, (“Characteristics of the Shared Transport Marketplace Method”).)

92. It is my opinion a person of ordinary skill in the art would have understood that such technology/servers necessarily include one or more processors, otherwise the processes/operations could not be performed. Accordingly, it is my opinion that a person of ordinary skill in the art would have understood that O’Sullivan discloses limitation [1.pre].

ii) [11.pre] A shared transport system, comprising:

[11.a.i] a memory storing instructions; and

[11.a.ii] a processor operatively connected to the memory, and configured to execute the instructions to perform operations including:

93. I have been asked to assume the preamble of claim 11 is limiting. Under that assumption, it is my opinion that O’Sullivan discloses the limitations therein. Additionally, O’Sullivan also discloses limitations [11.a.i] and [11.a.ii] as I discuss below.

94. As I discussed above for limitation [1.pre], O’Sullivan discloses a “shared transport system,” including under the Petitioners’ proposed construction that I was asked to consider. Additionally, as a person of ordinary skill in the art would have understood, the associated processes/operations of the system are implemented by at least one “processor” of the system because it uses, for example, “computer servers...to perform the data and communications functions as specified,” which necessarily include at least one processor. (EX1006, [0015],

[0156], FIG. 7; *see also id.*, [0080]-[0081], [0165].) It is my opinion that a person of ordinary skill in the art would have understood that specific “instructions” of the disclosed processes/operations, in order to be executed, are necessarily stored in the system’s “memory” (e.g., memory of computer servers) that is “operatively connected” to the disclosed “processor” “configured to execute the instructions to perform operations.” For example, O’Sullivan discloses “the experience of a rider in using the network system...may [be] **stored in memory**.” (EX1006, [0154]; *see also id.*, [0155] (“the experiences of a Driver in using the network system...may [be] **stored in memory**”), [0226]-[0228] (“measuring the volume of journeys between a plurality of locations, where the volume of spare transport capacity is **continually** monitored by wireless communications with the location-aware vehicles, **storing this information** in a stochastic data model, which can then predict available capacity and demand between any point in the covered geographic regions of the network by time of day, day of week, and day of year”), [0231]-[0232] (“the system: provides a **registry** which is able to **store** and display a series of destinations and times **from any given departure area**”).) Accordingly, it is my opinion that O’Sullivan discloses limitations [11.pre], [11.a.i], [11.a.ii].

iii) **[19.pre] A non-transitory computer readable medium comprising instructions that are executable by a processor to perform operations including:**

95. I have been asked to assume the preamble of claim 19 is limiting. Under that assumption, it is my opinion that O’Sullivan discloses the limitations therein. As I discussed for [11.pre] above, it is my opinion that O’Sullivan discloses memory comprising instructions executed by at least one processor to perform the disclosed operations/processes. In my opinion, a person of ordinary skill in the art would have understood that such memory includes a “non-transitory computer readable medium” because, in order for O’Sullivan’s system to function, it has to store these instructions and also continually make these instructions available to be executed by the processor(s) to perform the disclosed operations/processes. (EX1006, [0154] (“the experience of a rider in using the network system...may [be] **stored in memory**”), [0155] (“the experiences of a Driver in using the network system...may [be] **stored in memory**”).) For instance, O’Sullivan discloses “storing...information in a stochastic data model, which can then predict available capacity and demand between any point in the covered geographic regions of the network by time of day, day of week, and day of year.” (*Id.*, [0226]-[0228] (“measuring the volume of journeys between a plurality of locations, where the volume of spare transport capacity is continually monitored by wireless communications with the location-aware vehicles, **storing this information in a**

stochastic data model, which can then predict available capacity and demand between any point in the covered geographic regions of the network by time of day, day of week, and day of year”).) O’Sullivan also discloses “provid[ing] a **registry** which is able to **store** and display a series of destinations and times from any given departure area.” (*Id.*, [0231]-[0232] (“the system: provides a **registry** which is able to **store** and display a series of destinations and times from any given departure area”).) Accordingly, in my opinion, O’Sullivan discloses limitation [19.pre].

- iv) **[1.a]/[11.a.iii]/[19.a] receiving, from a transport user application operating on a transport user device corresponding to a transport user, a pick-up request for at least one person or item, the pick-up request identifying a pick-up location and a drop-off location for the at least one person or item;**

96. In my opinion, O’Sullivan discloses this limitation.

97. **First**, in my opinion, O’Sullivan discloses “a transport user application operating on a transport user device corresponding to a transport user,” because it discloses that rider/person 10 has a device 11 “equipped with a software layer with transport intelligence.” (EX1006, [0060]; *see also id.*, [0162] (O’Sullivan disclosing a transport user device “enabling Transport User to book travel, receive updates on travel information, confirm bookings and receive activity receipts, provide proof of identity and location, as well as update trust ratings on providers in the network”), Fig. 1 (device 11); *see* discussions for [1.pre].)

98. **Second**, in my opinion O’Sullivan discloses “receiving, from a transport user application..., a pick-up request for at least one person or item, the pick-up request identifying a pick-up location and a drop-off location for the at least one person or item.” For example, O’Sullivan discloses rider/person 10, via the rider software interface of device 11, sending a “Demand Route,” which identifies a “Pick-up Point” and a “Destination Point,” to “Shared Transport Marketplace” 12:

[A] person 10 desiring transportation service (“Rider”) has a personal communications device 11, optimally equipped with location information (“GPS Phone”), and uses this device 11, optimally equipped with a software layer with transport intelligence (“Rider Software Interface”), **to signal a transportation marketplace network (“Shared Transport Marketplace”) 12 with a demand interest for a particular start-point (“Pick-up Point”) and endpoint (“Destination Point”, and together, the “Demand Route”)**

(EX1006, [0060]; *see also id.*, [0063]-[0064], [0069] (“The Rider 10...can select a Pick-Up Point and Destination Point through a variety of functionally equivalent methods”), [0087] (“Rider wished to re-submit their Transport Demand request”), [0153] (disclosing with reference to FIG. 4 “[t]he Matching Engine 401 [of the network system] would consider the availability of transport capacity, provider criteria 404 and transport demand criteria 405 in providing ideal matches for the

request.”), FIG. 5a (showing “rider formulates and submits a transport demand request” and then “system presents supply route options”).)

99. O’Sullivan discloses that Rider 10, “upon submitting a Demand Route into the Shared Transport Marketplace 12,” receives “transport options available, by class of service, type of vehicle, time until Transport Capacity arrives at start-point, estimated transit time to end-point, number of legs in the journey, and cost.” (*Id.*, [0070].) According to O’Sullivan, this shared transportation service is provided for “individuals and/or goods.” (*Id.*, Abstract, [0012] (an “object of the invention to match a need to move individuals and/or goods from one geographic point to another geographic point”); *see also id.*; [0014], [0157] (“loading people or goods into a transport vehicle”), [0167] (“the transport demand needs of a plurality of individuals or items”).)

100. It is my opinion that O’Sullivan discloses the claimed “pick-up location” and “drop-off location” under the Petitioners’ proposed construction I was asked to consider. (*See* my discussion above in Section VII). (*See also* my

discussions above in Section IX.A.1(i) (my discussions relating to Petitioners’ proposed construction of “shared transport system” that I was asked to consider).¹²

“<u>pick-up location</u>” / “<u>drop-off location</u>”
“A node”: For example, O’Sullivan states that, “for the purposes of establishing a shared transport network, it is useful to establish a network of pick-up and drop-off points (nodes), so that Riders and Drivers can be guided to places that are

¹² I have been informed that, in district court, Patent Owner (PO) disagrees with Petitioners’ proposed construction of the claimed “pick-up location” and “drop-off location,” that I was asked to consider. I was also asked to consider O’Sullivan (and further as modified in view of Olmi as I discuss below) under the assumption that Petitioners’ proposed construction is not applied to these claim terms. Under that assumption, my opinions do not change as O’Sullivan, including as modified herein, still discloses these terms under any reasonable interpretation of the terms consistent with the language of the claims of the ’456 patent, its specification, and from my review of the prosecution history for the ’456 patent (EX1004), for the same reasons that I explain herein. Meaning, the O’Sullivan system and method (including as modified in light of Olmi) still discloses the claimed “pick-up location” and “drop-off location” in a manner consistent with the ’456 patent.

“pick-up location” / “drop-off location”

safe and convenient and comfortable for both the Riders and Drivers.” (*Id.*, [0113]; *see also id.*, [0111].)

“along an existing route defined before demand for transport and independently of a transport user’s door-to-door trip”: As I discussed for limitation [1.pre], O’Sullivan discloses that the available routes (e.g., the “Supply Route”) are predefined by drivers before receiving a request from a rider. (*See, e.g.*, [0063] (“When a driver starts the vehicle (‘Driver’ 13), a Driver Software Interface automatically determines if the Driver 13 is engaged in a traditional route (‘Supply Route’), and registers the transport capacity of the Driver 13 (‘Transport Capacity’) with the Shared Transport Marketplace 12.”).) O’Sullivan also explains that, “for the purposes of establishing a shared transport network, it is useful to establish a network of pick-up and drop-off points (nodes), so that Riders and Drivers can be guided to places that are safe and convenient and comfortable for both the Riders and Drivers.” (*Id.*, [0113].)

101. Thus, O’Sullivan discloses limitation [1.a]/[11.a.iii]/[19.a].

- v) **[1.b]/[11.b]/[19.b] identifying one or more transport providers available to service the pick-up request, based on information from a transport provider application operating on one or more transport provider devices corresponding to the identified one or more transport providers;**

102. In my opinion, O’Sullivan discloses this limitation.

103. **First**, O’Sullivan discloses “identifying one or more transport providers available to service the pick-up request.” For example, O’Sullivan discloses “consider[ing] the availability of transport capacity, provider criteria 404 and transport demand criteria 405 in **providing ideal matches** for the [rider’s] request.” (*See, e.g.*, EX1006, [0153] (“The Matching Engine 401 would consider the availability of transport capacity, provider criteria 404 and transport demand criteria 405 in **providing ideal matches for the request.**”); *see also id.*, [0083] (“As there could be hundreds of vehicles on the road that also provide Transport Capacity, this distinctive display serves the unique function of distinguishing the **Dispatched Transport Capacity which has been matched to the Demand Route from other Transport Capacity which may be on the same road at the same time.**”), [0086] (“**Upon a match-up of Rider 10 and Driver 13**, Rider would enter the Transport Capacity vehicle (“In Process Journey”), [0121] (“A system to generate matches between route capacity and timing and Transport Demands, from usage data. Regular traffic between nodes and subsets of nodes is gathered by

this system continually (FIG. 7, elements 709, 710, 711, 712). **The system 12 can thus tell a user who wishes to go from one point to the next how to best get there using the available transport capacity via it's matching engine (element 701).**”), [0122] (“All other considerations being equal, the matching engine 701 would thus **match the transport request between stop 1406 and stop 1409 using Transport Capacity 1403.**”), [0146] (“This enables, as shown in FIG. 4, **the Matching Engine 401 to consider matching transport demands with a variety of Transport Providers 402 and Provider criteria 404.**”), [0147] (“As shown in FIG. 7, when a Journey has been **matched between a Transport Provider 720 (Driver) and a Transport User 721 (Rider)**, the Journey is actively managed by the system 704.”), [0165] (disclosing that the shared transit marketplace server “[p]rovid[es] automated functions for...**matching demands**, refining trustability ratings, optimizing capacity and efficient throughput of the system.”).)

104. It is my opinion that O’Sullivan’s driver constitutes a “transport provider” under the Petitioners’ proposed construction I was asked to consider. (*See* my discussion above in Section VII). (*See also* my discussions above in Section

IX.A.1(i) (my discussions relating to Petitioners’ proposed construction of “shared transport system” that I was asked to consider).)¹³

“transport provider”
“A driver offering transport along an existing route defined before demand for transport and independently of a transport user’s door-to-door trip”: For example, as discussed for limitation [1.pre], O’Sullivan discloses that the

¹³ I have been informed that, in district court, Patent Owner (PO) disagrees with Petitioners’ proposed construction of the claimed “transport provider” that I was asked to consider. I was also asked to consider O’Sullivan (and further as modified in view of Olmi as I discuss below) under the assumption that Petitioners’ proposed construction is not applied to the claim term. Under that assumption, my opinions do not change as O’Sullivan, including as modified herein, still discloses a “transport provider” under any reasonable interpretation of the term consistent with the language of the claims of the ’456 patent, its specification, and from my review of the prosecution history for the ’456 patent (EX1004), for the same reasons that I explain herein. Meaning, the O’Sullivan system and method (including as modified in light of Olmi) still discloses the claimed “transport provider” in a manner consistent with the ’456 patent.

“transport provider”

available routes (e.g., the “Supply Route”) serviced by the driver are predefined by the driver. (*See, e.g.*, [0063] (“When a driver starts the vehicle (‘Driver’ 13), a Driver Software Interface automatically determines if the Driver 13 is engaged in a traditional route (‘Supply Route’), and registers the transport capacity of the Driver 13 (‘Transport Capacity’) with the Shared Transport Marketplace 12.”), [0122] (a transport provider “declare[s] . . . their Supply Route” as going through a series of defined nodes, and matches occur based on a transport user requesting pick-up and drop-off locations along, or sufficiently close to, the declared supply route), FIG. 14a.)

105. **Second**, in my opinion, O’Sullivan discloses that the above “identifying” process is performed “based on information from a transport provider application operating on one or more transport provider devices corresponding to the identified one or more transport providers.” For instance, O’Sullivan explains that vehicles/drivers providing transportation services have a “navigation device” that includes a driver “software layer.” (EX1006, [0062].) According to O’Sullivan, via the driver software, the device “registers the spare transport capacity and location information of the vehicles via wireless data communications to the registry of

capacity,” which, as discussed above, is used for matching. (*Id.*, [0166]; *see also id.*, [0015] (“The network system incorporates telecommunications and computing technology to match the supply of excess transport capacity with the demand for personal transport.”), [0163] (transport provider device includes “a GPS phone with an ability to display graphics...serving the primary functions of **enabling transport provider to advertise spare transport capacity**”), claim 1 (“providing an **electronic registry of capacity containing an indication of the spare transport capacity** and location of a plurality of transport vehicles”).) Accordingly, in my opinion, O’Sullivan discloses limitation [1.b]/[11.b]/[19.b].

- vi) [1.c]/[11.c]/[19.c] **transmitting the pick-up request to a transport provider device corresponding to a transport provider, the transport provider being one of the identified one or more transport providers;**

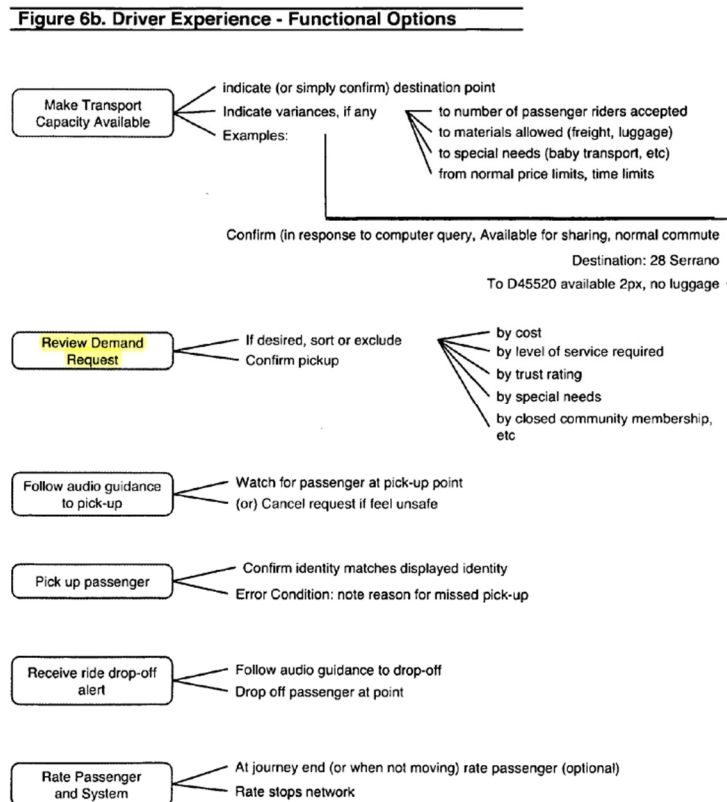
106. In my opinion, O’Sullivan discloses this limitation. O’Sullivan explains that the rider “selects from the [ride] **options** available to them” and “[a] **message is sent** to the nearest appropriate Transport Capacity.” (EX1006, [0072]; *see also id.*, [0073], Figs. 6a.)

In the event that the Rider 10 has a Rider Software Interface on their phone 11, the Rider 10 **selects from the options available to them. A message is sent to the nearest appropriate Transport Capacity.** The Driver 13 is automatically guided to the pick-up point, optimally through the Sat Nav Tracker 17 display unit with verbal

instructions. A Driver Software Interface determines if the Driver 13 is complying with the pick-up request, optimally based off the vehicle's movement and a period of time for the Driver 13 to automatically accept or deny the request (“Reserved Capacity”).

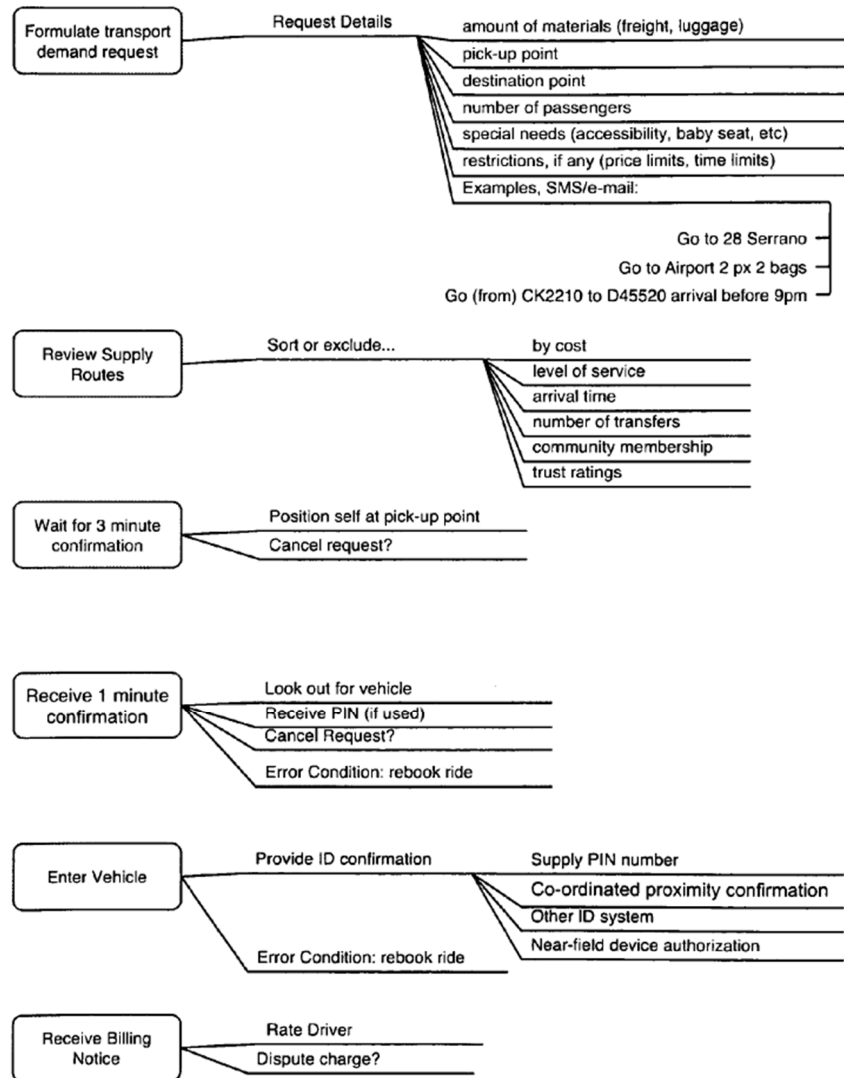
(EX1006, [0072].)

107. Additionally, as illustrated in Figure 6b (shown below and annotated), the Driver can “Review Demand Request” that corresponds to the Demand Request that was received from the rider, as illustrated in Figure 5b (shown below). (*Id.*, Fig. 5b, 6b.)



(EX1006, FIG. 6b (annotated).)

Figure 5b. Rider Experience, Functional Options Data and Action Details



(EX1006, FIG. 5b.)

108. Such communication is handled by the vehicle's (i.e., the Transport Capacity) "navigation device," which has "built-in or external data communication capability." (*Id.*, [0062].)

At the same time, **all vehicles that wish to provide transportation services which are in transit**

(“Transport Capacity”) have a navigation device, typically using GPS or other location finding technology, with built-in or external data communication capability, typically using cellular phone or wide area wireless data networks (“Sat Nav Tracker”), running a software layer with a Shared Transport interface (“Driver Software Interface”).

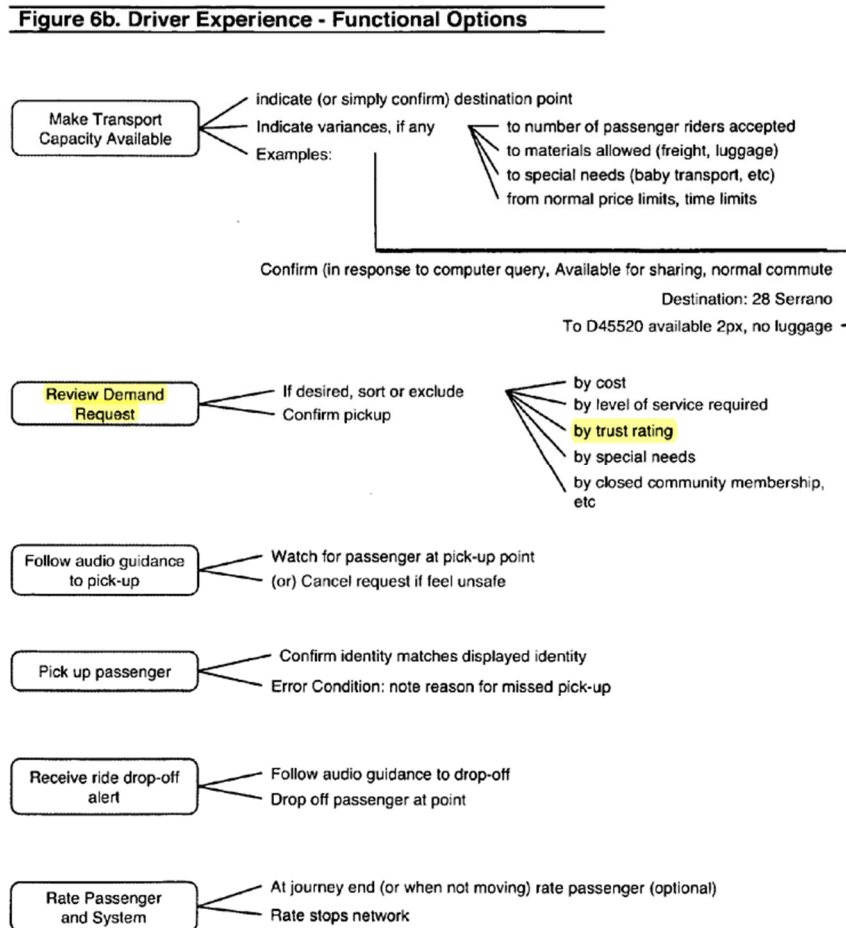
(*Id.*, [0062].)

109. Thus, in my opinion, O’Sullivan discloses limitation [1.c]/[11.c]/[19.c].

vii) [1.d]/[11.d]/[19.d] causing the transport provider device to display, via the transport provider application, one or more of the pick-up location or a transport user rating score associated with the transport user;

110. In my opinion, O’Sullivan discloses this limitation. For instance, O’Sullivan explains that the matched driver is “guided to the pick-up point...through the Sat Nav Tracker 117 display unit” corresponding to the navigation device, which discloses causing the device to “display, via the transport provider application,...the pick up location.” (EX1006, [0072]; *see also id.*, [0062] (describing the “navigation device” having a “Sat Nav Tracker” and a “software layer”), [0076], [0163] (explaining that the transport provider device may be “a GPS phone with an ability to display graphics,” “a personal navigation device or built-in sat-nav unit, serving the primary functions of enabling transport provider to advertise spare transport capacity, route the driver to pick-up locations”).)

111. Additionally, as shown in Figure 6b (below), O’Sullivan explains that the Driver can “Review Demand Request,” including by “trust rating” (“transport user rating score associated with the transport user”). And, according to Figure 6b, the “Demand Request” includes the “pick-up point” (pick up location). Thus, as these figures further demonstrate, O’Sullivan discloses limitation [1.d]/[11.d]/[19.d].



(EX1006, FIG. 6b (annotated).)

viii) [1.e]/[11.e]/[19.e] receiving an indication of an acceptance of the pick-up request;

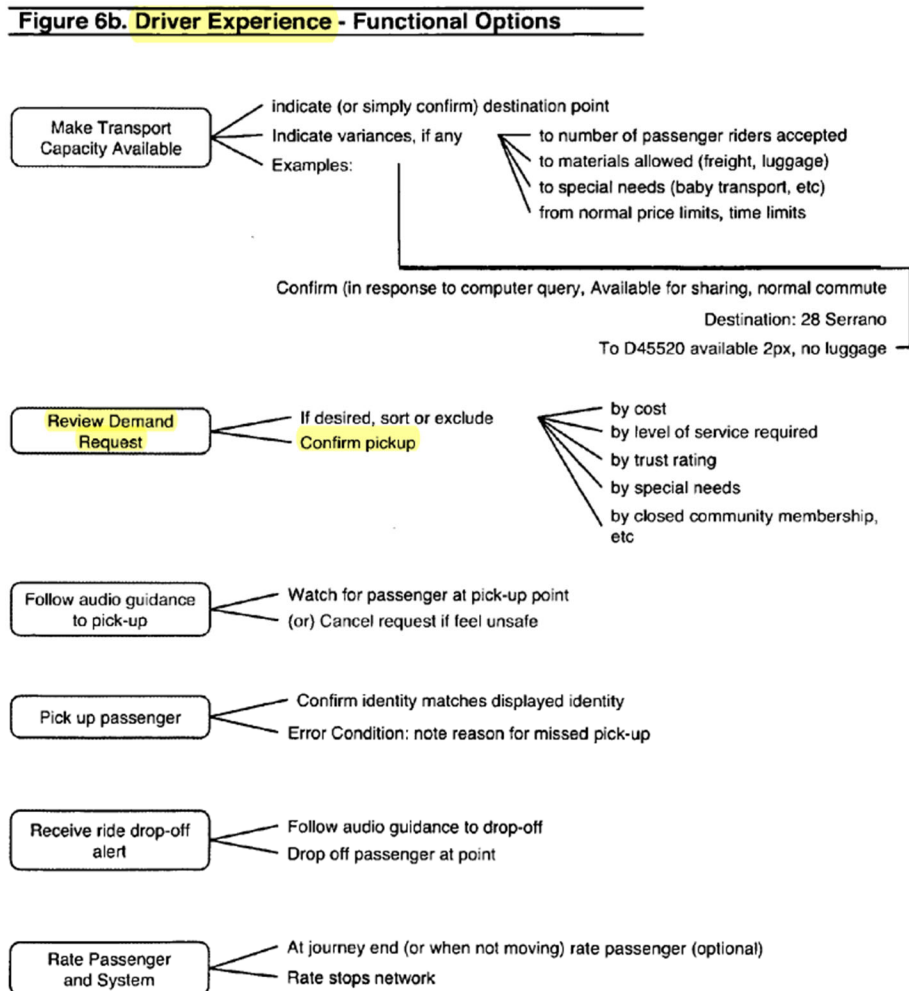
112. In my opinion, O’Sullivan discloses this limitation. For example, O’Sullivan discloses that the driver software interface determines if the matched driver complies with the pick-up request, which may be based on “the vehicle’s movement” and “a period of time for the Driver 13 to automatically accept or deny the request.” (EX1006, [0072].)

In the event that the Rider 10 has a Rider Software Interface on their phone 11, the Rider 10 selects from the options available to them. A message is sent to the nearest appropriate Transport Capacity. The Driver 13 is automatically guided to the pick-up point, optimally through the Sat Nav Tracker 17 display unit with verbal instructions. A Driver Software Interface determines if the Driver 13 is complying with the pick-up request, optimally **based off the vehicle's movement and a period of time for the Driver 13 to automatically accept or deny the request** (“Reserved Capacity”).

(EX1006, [0072].)

113. O’Sullivan further describes a “means of automated communication with the transport capacity to confirm the availability and **willingness of the capacity to transport the demand.**” (*Id.*, [0182].) Additionally, in Figure 6b

(shown and annotated as below), O’Sullivan illustrates that the “Driver Experience,” which includes “Review Demand Request” and “Confirm pickup.” (*Id.*, Fig. 6b.)



(EX1006, FIG. 6b (annotated).)

114. Thus, in my opinion, O’Sullivan discloses limitation [1.e]/[11.e]/[19.e].

- ix) **[1.f]/[11.f]/[19.f] causing the transport provider device to display, via the transport provider application, at least:**
 - (1) **[1.f.i]/[11.f.i]/[19.f.i] (1) navigation instructions from a location of the transport provider to the pick-up location, the location determined based on GPS position data of the transport provider device; and**

115. In my opinion, O’Sullivan discloses this limitation. O’Sullivan explains the matched driver is guided to the pick-up point using its navigation device with Sat Nav Tracker 17 and GPS capability (“transport provider device”). (EX1006, [0072]; *see also id.*, [0076], [0079].)

In the event that the Rider **10** has a Rider Software Interface on their phone **11**, the Rider **10** selects from the options available to them. A message is sent to the nearest appropriate Transport Capacity. **The Driver 13 is automatically guided to the pick-up point, optimally through the Sat Nav Tracker 17 display unit with verbal instructions.** A Driver Software Interface determines if the Driver **13** is complying with the pick-up request, optimally based off the vehicle's movement and a period of time for the Driver **13** to automatically accept or deny the request (“Reserved Capacity”).

(EX1006, [0072].) Indeed, O’Sullivan explains that the transport provider device may be “**a GPS phone with an ability to display graphics,**” “a personal

navigation device or built-in sat-nav unit, serving the primary functions of enabling transport provider to...**route the driver to pick-up locations.**” (*Id.*, [0163]; *see also id.*, [0182]-[0185].)

(2) [1.f.ii]/[11.f.ii]/[19.f.ii] (2) **information descriptive of the at least one person or item;**

116. In my opinion, O’Sullivan discloses this limitation. O’Sullivan discloses that, as the driver “approaches the Pick-up Point,” the driver would be “presented with a picture of the Rider(s) and the identification name of each Rider.” (EX1006, [0085].)

As Transport Capacity **approaches the Pick-up Point**, the Driver would position the vehicle at the Pick-up Point, and optimally **the Driver would be presented with a picture of the Rider(s) and the identification name of each Rider (“Nickname”)**. If the Rider does not match their picture, the Driver would choose to refuse the shared ride, and would submit, through the Driver Software Interface, the reason for denying the ride. (At this point, an operator of the Shared Transport Marketplace **12** would attempt to contact the Rider through the information provided with their registration details to see if there was a human error or to see if the Rider's GPS Phone had been stolen, in order to disable future Shared Transport Services). If a PIN were provided to the Rider, the Rider would be prompted by the driver to

enter the PIN (or the driver would enter it himself), and the match would thus be verified, or the match could also be verified through the method of Continuous Co-ordinated Proximity, described below.

(EX1006, [0085]; *see also id.*, [0099] (“Personal communications device could show the picture and name identification of the driver responding to pickup request.”).)

Thus, in my opinion, O’Sullivan discloses this limitation.

x) **[1.g]/[11.g]/[19.g] causing the transport user device to display, via the transport user application:**

(1) **[1.g.i]/[11.g.i]/[19.g.i] information descriptive of one or more of the transport provider, a transport provider vehicle associated with the transport provider, or a transport provider rating score associated with the transport provider;**

117. In claims 1, 11, or 19, limitation [1.g.i]/[11.g.i]/[19.g.i] recites three separate options. I understand the “or” means only one of these three options must be shown to satisfy this limitation. O’Sullivan discloses the first two options, i.e., “causing the transport user device to display, via the transport user application”:

(1) “information descriptive of one or more of the **transport provider**”; and

(2) “a **transport provider vehicle** associated with the transport provider.”

118. For example, O’Sullivan explains that information descriptive of **the driver** and/or **the vehicle** may be sent after acceptance of the pick-up request by the driver but before rider pick-up to prompt the rider to be on the lookout for the vehicle, “along with the specific color, model, picture and/or other identifying characteristics.” (EX1006, [0078].) Rider’s GPS phone may also “show the picture and name identification of **the driver** responding to pickup request.” (*Id.*, [0099].) Thus, in my opinion, O’Sullivan discloses this limitation.

- (2) [1.g.ii]/[11.g.ii]/[19.g.ii] an estimated cost associated with servicing the pick-up request;
- (3) [1.g.iii]/[11.g.iii]/[19.g.iii] an estimated time associated with arrival of the at least one person or item at the drop-off location; and

119. In my opinion, O’Sullivan in view of Olmi discloses and/or suggests limitations [1.g.ii]/[11.g.ii]/[19.g.ii] and [1.g.iii]/[11.g.iii]/[19.g.iii].

120. In my opinion, O’Sullivan does not expressly disclose “causing the transport user device to display, via the transport user application,” after acceptance of the pick-up request by the driver but before rider pick-up:

- “an estimated cost associated with servicing the pick-up request” or
- “an estimated time associated with arrival of the at least one person or item at the drop-off location.”

(*See also* Sections VI.B.1(ii)-(iii) for my discussions above, where I explained, based on the disclosures of Priority Applications, a person of ordinary skill in the art

would not have understood that the named inventor possessed the features recited in limitations [1.g.ii]/[11.g.ii]/[19.g.ii] and [1.g.iii]/[11.g.iii]/[19.g.iii].) Nevertheless, in my opinion, a person of ordinary skill in the art would have been motivated to implement these features in view of Olmi.

121. Olmi is similar to O’Sullivan in that it discloses a system where a traveler uses a cell phone to request a ride, and the system provides a route for “[a] transit vehicle so that each [traveler] thus grouped is picked up and conveyed exactly according to his itinerary.” (EX1005, Abstract; *see also id*, 32 (“In figure 6 a prospective traveller 19 **uses a communicator device 17 to formulate and send his journey request** to a central controlling computer system 15 via the data transmission system 16”), FIG. 6.)

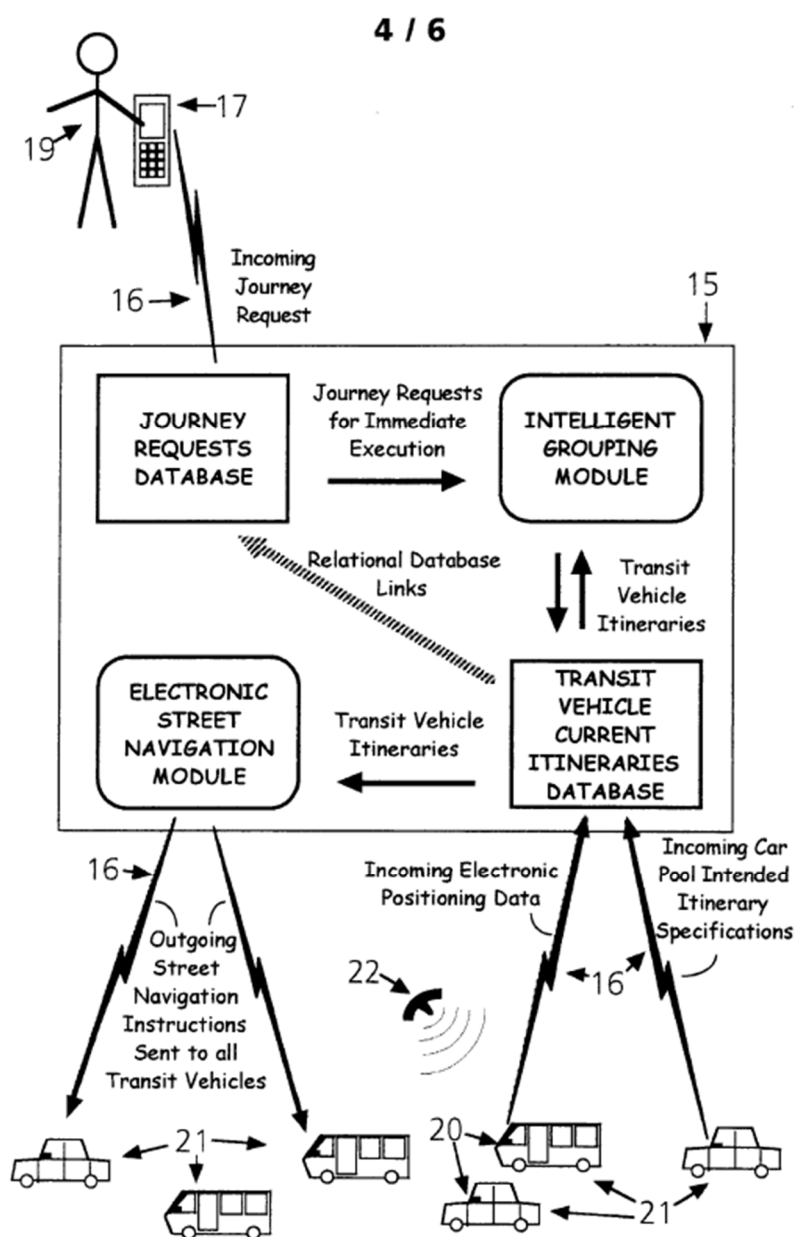


Figure 6

(EX1005, FIG. 6.)

Thus, a person of ordinary skill in the art would have understood that Olmi is similar to O'Sullivan, and both are akin to the claimed features of the '456 patent. (See my discussions for limitation [1.pre] above.) Accordingly, such a person of ordinary

skill in the art would have been motivated to consider disclosures of Olmi when implementing the method/system akin to that of O’Sullivan.

122. Olmi additionally discloses that after the rider “selects the destination address,” “[o]n the telephone’s display screen, a validation message summarises the travel itinerary...just requested,” which includes various information associated with the ride, as illustrated below. (EX1005, 87.)

<u>Traveller Journey Request</u> Embarkation: Home > 56 Muswell Hill, N10 3ST Destination: Office > 110 Charing Cross Rd, WC2H 0JP Departure Time: Immediate Transit Vehicle Type: Taxibus Passengers: 1
--

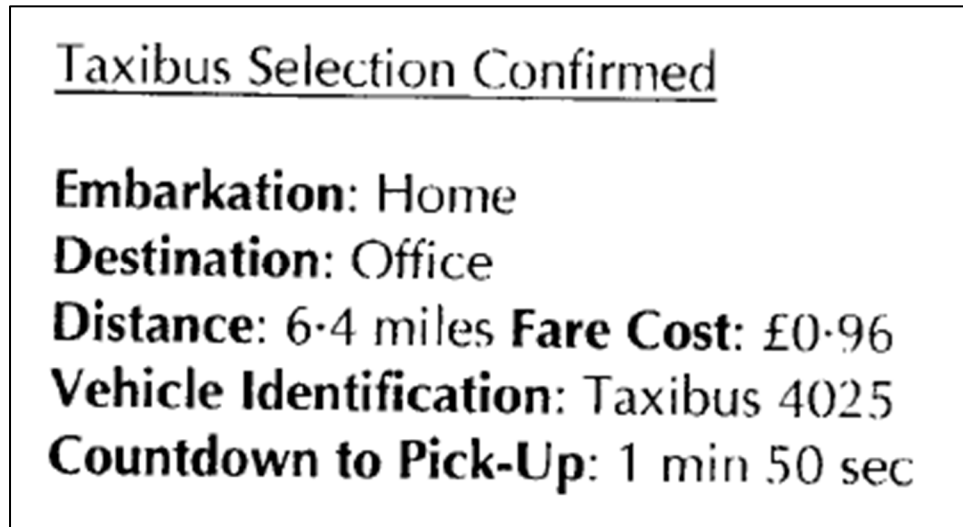
(*Id.*)

123. Olmi also explains that after the request is received/accepted, the “details [of] a nearby transit vehicle” are “displayed on [the] cellular phone” in the following format. (*Id.*)

<u>Transit Vehicle Availability</u>				
Vehicle	Pick-Up	Journey	Cost	Arrival
Taxibus	2 mins	34 mins	£0.96	8:58pm
Please Confirm: <u>YES</u> NO				

(*Id.*)

124. According to Olmi and as shown below, if “YES” is selected, the “cellular phone subsequently displays some confirmatory details,” which “**remain visible** and provide a real-time countdown to pickup.” (*Id.*)



(*Id.*)

125. Accordingly, a person of ordinary skill in the art would have understood that Olmi discloses displaying on a rider mobile device information associated with the ride, including “**cost**” and an estimated time associated with “**arrival**” at the drop-off location **after a transit vehicle that is available has accepted the request but before pick-up**. As such, a person of ordinary skill in the art would have understood that Olmi discloses “causing the transport user device to display, via the transport user application:...an estimated cost associated with servicing the pick-up”

request” and “an estimated time associated with arrival of the at least one person or item at the drop-off location.”

126. In my opinion, based on Olmi’s teachings, a person of ordinary skill in the art would have had good reason to cause the rider’s mobile device software interface to **display information associated with the ride**, including **during the period leading up to pick-up**, consistent with Olmi’s teachings. A person of ordinary skill in the art would have understood, based on Olmi’s teachings and/or suggestions, such information would include:

(1)**cost for the ride** (limitation [1.g.ii]/[11.g.ii]/[19.g.ii]: “an estimated cost associated with servicing the pick-up request”),
and

(2)**estimated time to the drop-off location** (limitation [1.g.iii]/[11.g.iii]/[19.g.iii]: “an estimated time associated with arrival of the at least one person or item at the drop-off location”).

127. In my opinion, a person of ordinary skill in the art would have been motivated to display such information **during this period** and would have found it useful, because doing so would have **improved the rider experience** by showing relevant ride details—such as estimated cost and estimated time until arrival—when those details might be needed. For example, implementing such a feature would let a rider quickly check an estimated cost to confirm they have sufficient funds or to

calculate how to split the cost with others. Likewise, it would keep the rider informed of changes to the estimated arrival time caused by delays experienced by the driver prior to pick up, which could affect the rider's plans.

128. In my opinion, based on O'Sullivan and Olmi's teachings as well as knowledge of a person of ordinary skill in the art, such a person would have had a reasonable expectation of success implementing such a combination of O'Sullivan and Olmi. In fact, such information associated with the ride is already made available and displayed in O'Sullivan's system, and the rider's device in O'Sullivan is capable of displaying these kinds of ride-related information when displaying driver options for selection. (EX1006, [0025], [0070], [0081], [0092], [0162] ("a GPS phone with an ability to display graphics...").) Thus, the O'Sullivan-Olmi combination would have merely required displaying such information **while the rider waits to be picked up by the driver**, consistent with Olmi's disclosures.

129. In my opinion, based on the knowledge and skill of a person of ordinary skill in the art as well as the collective teachings in O'Sullivan and Olmi, such a person would have appreciated that the O'Sullivan-Olmi combination would have leveraged **a combination of known and existing prior art technologies** (e.g., transport systems like those described in O'Sullivan and displaying ride-relevant information to a rider) **according to known methods** (e.g., software changes to display such information). Such a modification would have predictably resulted in

an O’Sullivan-Olmi combination having a shared transport system that provides useful information to riders prior to pick up. Thus, in my opinion, O’Sullivan in view of Olmi discloses and/or suggests these limitations.

(4) **[1.g.iv]/[11.g.iv]/[19.g.iv] location information of the transport provider based on the GPS position data of the transport provider device;**

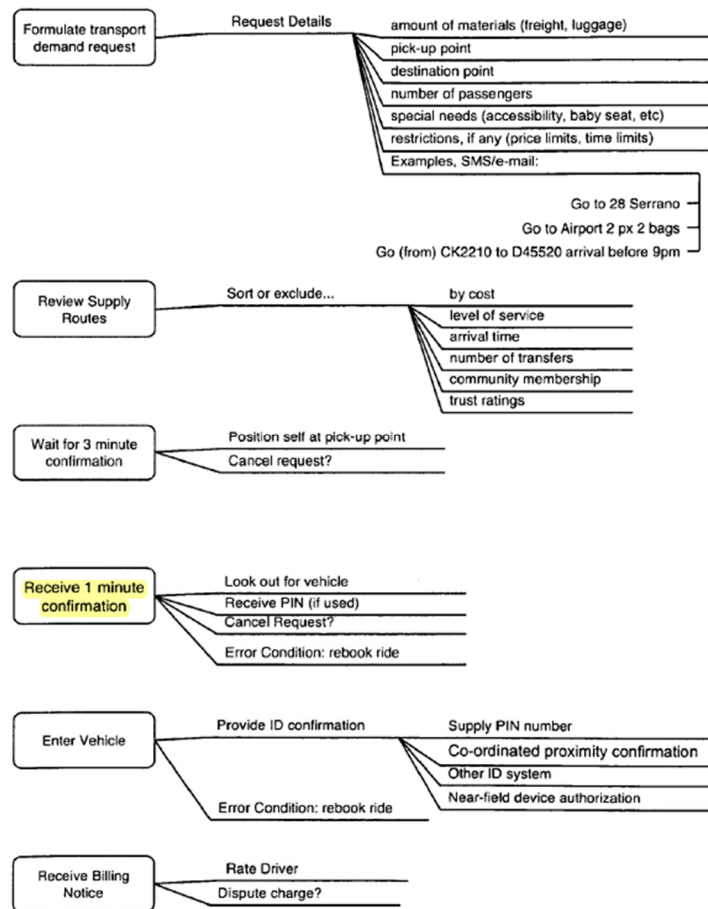
130. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this claim limitation.

131. For example, O’Sullivan discloses:

At or before the One Minute Warning Time, a message would optimally be sent to indicate to the Rider to be on the lookout for the Transport Capacity, along with the specific color, model, picture and/or other identifying characteristics of the transport capacity **that was arriving.** If necessary, the Rider would also be provided with a PIN to verify their identity and booking.

(EX1006, [0078].) O’Sullivan also states that the rider will “Receive 1 minute confirmation.” (*Id.*, Fig. 5b (highlighted and shown below).)

Figure 5b. Rider Experience, Functional Options Data and Action Details



(EX1006, FIG. 5b. (annotated).)

132. In my opinion, a person of ordinary skill in the art would have understood that such a proximity alert constitutes “location information of the transport provider based on the GPS position data of the transport provider device,” as it indicates that the provider is nearby based on the driver’s GPS position. Thus, in my opinion, O’Sullivan discloses this limitation.

- xi) **[1.h]/[11.h]/[19.h] receiving an indication, based on the GPS position data of the transport provider device, that the transport provider is approaching the pick-up location;**

133. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. For example, O’Sullivan discloses:

When the Driver 13 approached the Rider Destination, and possibly **at points along the way**, the Rider 10 and Driver 13 could be **polled for their location information** to verify that the ride was **progressing** (“Continuous Co-ordinated Proximity” elements and methods of which are illustrated in FIGS. 10 a and 10 b).

(EX1006, [0088].) A person of ordinary skill in the art would have understood that the disclosed “points along the way” to the rider destination includes the “pick-up location” as claimed.

134. Additionally, O’Sullivan explains that “[p]rocessing and communications could be done either **locally** (using software **inside the Transport Capacity vehicle**..., and communicating via near-field communications **inside the Transport Capacity vehicle**...or via network polling to Sat Nav Tracker 17 or GPS Phone 11, or a similar combination of methods and communications.” (*Id.*) O’Sullivan also discloses that positionings of the driver’s device (Sat Nav Tracker device) and the rider’s device (GPS phone) are determined **using GPS technology**. (*Id.*, [0067] (“determining **positioning** for the **Sat Nav Tracker device 17** and the

GPS Phone 11 is through the use of **a GPS 14** or Magellan satellite”).) Accordingly, O’Sullivan describes the driver’s device providing information as it approaches the pick-up location (the claimed “indication”), which is a point along the way, using the device’s GPS capabilities.

135. Thus, in my opinion, O’Sullivan discloses limitation [1.h]/[11.h]/[19.h].

- xii) [1.i]/[11.i]/[19.i] in response to receiving the indication that the transport provider is approaching the pick-up location, causing the transport user device, via the transport user application, to display a notification indicative of the approaching transport provider;**

136. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. For example, O’Sullivan discloses that, when the “indication” that the vehicle is approaching the pick-up location is received (as discussed for limitations [1.h]/[11.h]/[19.h]), such as “[a]t or before the One Minute Warning time,” the system 12 sends “a message” to the rider’s device, which causes its software to display a notification to be “on the lookout for the Transport Capacity, along with the specific color, model, picture and/or other identifying characteristics of the transport capacity that was arriving.” (EX1006, [0078]; *see also id.*, [0076]-[0077].)

- xiii) [1.j]/[11.j]/[19.j] receiving, from the transport provider device, an indication that the at least one person or item has been picked up;**

137. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. For example, O’Sullivan explains that, to verify pick up, “Shared Transport Marketplace 12 would then optimally verify, through the location information in the Sat Nav Tracker 17 and in the GPS Phone 11, that the Rider and Driver were indeed at the same location.” (EX1006, [0086]; *see also id.*, [0087] (explaining that the system may know if a rider is not picked up “due to the divergence in location information between the GPS Phone 11 and the Sat Nav Tracker 17”).) O’Sullivan also discloses that the pick-up may be verified by, e.g., “entry of a PIN.” (*Id.*, [0192].)

[S]uch means of **verification of the pick-up of the transport capacity by the transport provider** can be accomplished by methods including 1. **entry of a PIN** (personal identification number) provided by the transport user to the transport provider and entered on the in-vehicle system.

(*Id.*, [0192].)

- xiv) [1.k]/[11.k]/[19.k] causing the transport provider device, via the transport provider application, to display navigation directions to the drop-off location based on the GPS position data of the transport provider device;

138. In my opinion, O’Sullivan in view of Olmi discloses and/or suggests this limitation.

139. O’Sullivan does not expressly disclose “causing the transport provider device, via the transport provider application, to display navigation directions to the drop-off location based on the GPS position data of the transport provider device.” Nevertheless, in my opinion, a person of ordinary skill in the art would have been motivated to implement this feature based on the disclosures of Olmi.

140. A person of ordinary skill in the art would have had good reason to consider the disclosures of Olmi when implementing a method/system like that disclosed in O’Sullivan, consistent with what I discussed above for limitations [1.g.ii]/[11.g.ii]/[19.g.ii] and [1.g.iii]/[11.g.iii]/[19.g.iii]. Additionally, Olmi discloses that, after pick up, its system provides “**real-time street navigation instructions** on a dashboard display screen” to guide the driver “**along the...route.**” (EX1005, 95; *see also id.*, 14 (“in-car satellite navigation systems make use of a digitised street layout map, and **make use of data from a satellite electronic positioning system, in order to provide the car driver with real-time navigation instructions** which are based on, and dynamically respond to, the vehicle’s current

geographic location”), 15 (“the drivers in each of the said transit vehicles being directed along the said optimal transit routes to convey the said travellers by means of navigational data supplied by an electronic street navigation module incorporated into the said controlling computer system”; “the said navigational data being sent to the communicator device within each of the said transit vehicles, these communicator devices detailing the navigational data to the drivers of the said transit vehicles”).)

141. In my opinion, a person of ordinary skill in the art would have had good reason to implement such a feature in a method/system similar to that described in O’Sullivan, for example, by displaying navigation instructions on the software interface of driver’s Sat Nav Tracker 17 display unit. This is because, for example, and as a person of ordinary skill in the art would have appreciated, such a feature would have provided **persistent and precise navigation instructions** to the drop-off location, enhancing the driver and rider experience. For example, Olmi discloses providing:

the car driver with **real-time navigation instructions**
which are based on, and **dynamically respond to, the**
vehicle’s current geographic location.

(EX1005, 14.) Accordingly, drivers and riders can be confident that the displayed navigation guidance will be timely, accurate, and responsive to changing conditions,

thereby reducing routing uncertainty, minimizing delay, and improving overall trip efficiency and safety.

142. In my opinion, based on O’Sullivan and Olmi’s teachings as well as knowledge of a person of ordinary skill in the art, such a person would have had a reasonable expectation of success implementing such a combination of O’Sullivan and Olmi, particularly because O’Sullivan already describes using GPS technology and a Sat Nav Tracker. (EX1006, [0062] (“all vehicles that wish to provide transportation services...have a navigation device”), [0067] (“determining positioning for the Sat Nav Tracker device 17 and the GPS Phone 11 is through the use of a GPS 14 or Magellan satellite”).) Additionally, Olmi explains that such navigation systems were “commonly available.” (EX1005, 14.) Accordingly, such a person would have recognized that the above-described combination would have merely involved a combination of known and existing prior art technologies (e.g., known transport systems and GPS navigation technology) according to known methods (e.g., known and commonly available navigation systems, as described in Olmi). As a person of ordinary skill in the art would have understood, such a modification would have predictably resulted in an O’Sullivan-Olmi combination having a shared transport system that provides an enhanced driving and rider experience using real-time navigation.

- xv) **[1.I]/[11.I]/[19.I] causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location or the location information of the transport provider based on the GPS position data of the transport provider device;**

143. In my opinion, O’Sullivan in view of Olmi discloses and/or suggests this limitation. Based on the teachings of O’Sullivan and Olmi, a person of ordinary skill in the art would have been motivated to implement displaying on a rider mobile device information associated with the ride, including an estimated time associated with “arrival,” after a transit vehicle that is available is selected but before pick-up, consistent with my discussions for limitation [1.g.iii]/[11.g.iii]/[19.g.iii]. Olmi describes displaying similar information as a rider “**is nearing his destination,**” as illustrated below. Olmi explains that such “information is...available on [the rider’s] cellular telephone.” (EX1005, 95.)

NEXT STOP: Charing Cross Rd, WC2
Arrival Time: 2 minutes
Passengers Alighting: Alex-G

(*Id.*)

144. In my opinion, based on teachings of O’Sullivan and Olmi as well as knowledge and skill of a person of ordinary skill in the art, such a person would have

had both good reason and a reasonable expectation of success in implementing such a feature for the reasons discussed above with respect to limitation [1.g.iii]/[11.g.iii]/[19.g.iii]. For example, a person of ordinary skill in the art would have understood that such a feature would keep the rider apprised of any changes to the estimated time until arrival, which would have made it easier for the rider to make any accommodations in view of the changes.

145. Accordingly, in my opinion, the O’Sullivan-Olmi combination discloses and/or suggests “causing the transport user device, via the transport user application, to display one or more of an estimated time associated with arrival of the at least one person or item at the drop-off location,” as recited in limitation [1.1]/[11.1]/[19.1].

xvi) [1.m]/[11.m]/[19.m] tracking progress of travel of the transport provider along a route from the pick-up location to the drop-off location based on one or more of the GPS position data of the transport provider device or GPS position data of the transport user device;

146. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. For example, O’Sullivan discloses that:

When the Driver 13 approached the Rider Destination, and possibly at points along the way, the Rider 10 and Driver 13 could be **polled for their location information to verify that the ride was progressing** (“Continuous Co-

ordinated Proximity” elements and methods of which are
illustrated in FIGS. 10 a and 10 b).

(EX1006, [0088].)

147. O’Sullivan explains that the above discussed “poll[ing]” process is facilitated by driver’s Sat Nav Tracker or rider’s GPS Phone, “each having separately determined but accurate location and time information...[and] can be asserted to be verifiably in transit with each other through their continuous [coordinated] proximity.” (*Id.*, [0088], FIGS. 10a and 10b, [0089], [0182]-[0196], [0226] (“measuring the volume of journeys between a plurality of locations, where the volume of spare transport capacity is continually monitored by wireless communications with the **location-aware vehicles**”), [0227], [0246] (“two different devices, one possessed by the transport provider, and the other by the transport user, with **each having separately determined but accurate location and time information (for example, GPS phones) can be asserted to be verifiably in transit with each other through their continuous co-ordinated proximity.**”); *see also id.*, FIGs. 8a, 8b, 9a, 9b, 14a-14i.) Thus, O’Sullivan discloses limitation [1.m]/[11.m]/[19.m].

- xvii) **[1.n]/[11.n]/[19.n] receiving an indication that the transport provider has delivered the at least one person or item to the drop-off location from at least one of the transport provider device or the transport user device;**

148. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. O’Sullivan discloses that the delivery of the transport service is verified based on simultaneous geographic proximity, and, at the end of this journey, a message is sent to rider with the details and any billing information about the journey. For example, O’Sullivan explains that “[w]hen the Driver 13 approached the Rider Destination,...the **Rider 10 and Driver 13 could be polled for their location information to verify that the ride was progressing** (‘Continuous Co-ordinated Proximity’ elements and methods of which are illustrated in FIGS. 10 a and 10 b).” (EX1006, [0088] (“When the Driver 13 approached the Rider Destination, and possibly at points along the way, the Rider 10 and Driver 13 could be polled for their location information to **verify** that the ride was progressing (‘Continuous Co-ordinated Proximity’ elements and methods of which are illustrated in FIGS. 10 a and 10 b).”), FIG. 10b, [0246] (“two different devices, one possessed by the transport provider, and the other by the transport user, with **each having separately determined but accurate location and time information (for example, GPS phones) can be asserted to be verifiably in transit with each other through their continuous co-ordinated proximity.**”).)

149. Moreover, O’Sullivan explains that:

The delivery of the transport service could be proven beyond a reasonable doubt through the continuous co-ordinated proximity between the Driver and the Rider according to the verification of simultaneous geographic proximity as illustrated in FIG. 10 b.

(*Id.*, [0088]; *see also id.*, [0197] (“providing the transport user’s proof of delivery to the destination location... via automatic communication between the in-vehicle device, by the confirmation of the transport provider and the transport user”).) Thus, O’Sullivan discloses limitation [1.n]/[11.n]/[19.n].

xviii) [1.o]/[11.o]/[19.o] transmitting trip summary data associated with the pick-up request to the transport user device, the trip summary data displayable via the transport user application and including a cost for servicing the pick-up request and a transport provider rating prompt soliciting the transport user to provide a rating value for the transport provider;

150. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. For example, O’Sullivan discloses that:

At the end of each journey, as the Rider leaves the vehicle, they are messaged with the details and cost of their journey on their GPS phone 11 (via SMS, e-mail, or via a special application or web page, for example). This message also could prompt the Rider to rate the

Driver, for example, with 1 to 5 stars, on one or more scales (safety, comfort, social factors).

(EX1006, [0092]; *see also id.*, [0088] (“At the end of this journey, a message would be send to Rider with the details and any billing information about the journey.”), FIG. 7.) Thus, O’Sullivan discloses limitation [1.o]/[11.o]/[19.o].

xix) [1.p]/[11.p]/[19.p] receiving the rating value for the transport provider from the transport user device via the transport user application;

151. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. For example, O’Sullivan discloses:

At the end of each journey, as the Rider leaves the vehicle, they are messaged with the details and cost of their journey on their GPS phone 11 (via SMS, e-mail, or via a special application or web page, for example). This message also could prompt the Rider to rate the Driver, for example, with 1 to 5 stars, on one or more scales (safety, comfort, social factors).

(EX1006, [0092].) The rider’s rating of the driver (“rating value for the transport provider from the transport user device via the transport user application”) is “receiv[ed]” by O’Sullivan’s system as it “could be used to automatically ‘blacklist’ that Rider from ever matching with the Driver again.” (*Id.*, [0092]; *see also id.*, FIG. 7.)

A sufficiently low rating (for example, 1 star), could be used to automatically “blacklist” that Rider from ever matching with the Driver again (using the Matching Engine 701, as shown in FIG. 7, in conjunction with the rating systems of the Transport Provider Management System 705 and the Transport User Management System 706).

(EX1006, [0092].)

152. Thus, O’Sullivan discloses limitation [1.p]/[11.p]/[19.p].

xx) [1.q]/[11.q]/[19.q] updating the transport provider rating score of the transport provider based on the received rating value for the transport provider; and

153. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests this limitation. As I discussed above for limitation [1.p]/[11.p]/[19.p], O’Sullivan discloses that, based on the rider’s rating of the driver, the system could “automatically ‘blacklist’ that Rider from ever matching with the Driver again” if the driver received “[a] sufficiently low rating.” (EX1006, [0092].)

A sufficiently low rating (for example, 1 star), could be used to automatically “blacklist” that Rider from ever matching with the Driver again (using the Matching Engine 701, as shown in FIG. 7, in conjunction with the rating systems of the Transport Provider Management

**System 705 and the Transport User Management
System 706).**

(EX1006, [0092].) Accordingly, a person of ordinary skill in the art would have understood that the “the transport provider rating score of the transport provider based on the received rating value for the transport provider” is “update[ed]” in O’Sullivan’s system in order to prevent future matches.

154. Additionally, O’Sullivan discloses a **“self-correcting** trust system for **feedback of Rider response** to Driver performance,” where the rider’s “measurement of trustability” associated with the driver is provided to the system. (EX1006, [0147].)

A self-correcting trust system for feedback of Rider response to Driver performance. As shown in FIG. 7, when a Journey has been matched between a Transport Provider 720 (Driver) and a Transport User 721 (Rider), the Journey is actively managed by the system 704. As part of this process, the Rider is prompted to **provide a measurement of trustability to the Driver. This event 702 is then passed on to the self-correcting trust system within the Transport Provider Data Management system 705.**

(EX1006, [0147].) O’Sullivan goes on to describe more details of its “trust system”:

A trust system for managing networks of Transport Providers with varying trust characteristics. As shown

in FIG. 7, **the Transport Providers/Drivers are managed by a system 705 which considers their ratings** (as provided to the system by an Activity and Event Manager 702) and their community memberships 713. This enables, as shown in FIG. 4, the Matching Engine 401 to **consider matching transport demands with a variety of Transport Providers 402 and Provider criteria 404.**

(EX1006, [0146].)

155. O’Sullivan further states that the transport user device can be used to “update trust ratings on providers in the network.” (*Id.*, [0162].) Thus, in my opinion, O’Sullivan discloses limitation [1.q]/[11.q]/[19.q].

xxi) [1.r]/[11.r]/[19.r] causing the cost for servicing the pick-up request to be charged to a payment method associated with the transport user.

156. In my opinion, O’Sullivan in view of Olmi discloses and/or suggests this limitation. While O’Sullivan discloses “a message would be sen[t] to Rider with the details and any billing information about the journey” (EX1006, [0088]), it does not disclose or suggest “causing the cost for servicing the pick-up request to be charged to a payment method associated with the transport user.” Nevertheless, a person of ordinary skill in the art would have been motivated to implement this feature in view of Olmi.

157. As discussed above for limitations [1.g.ii]/[11.g.ii]/[19.g.ii] and [1.g.iii]/[11.g.iii]/[19.g.iii], a person of ordinary skill in the art would have had good reason to consider Olmi's disclosures when implementing a method/system similar to that of O'Sullivan. Additionally, Olmi discloses a process to "debit[] the passenger's monetary account":

For speed and simplicity, no money is exchanged in the vehicle: the controlling computer system handles all financial transactions automatically. Every person registered with the controlling computer system will have their own system-administered monetary account (see section 9.7), and **after a car pool journey, the controlling computer system credits the driver's monetary account with his fee and debits the passenger's monetary account by an amount which represents the fare for his journey.**

(EX1005, 46.) Accordingly, in my opinion, a person of ordinary skill in the art would have understood that Olmi discloses "causing the cost for servicing the pick-up request to be charged to a payment method associated with the transport user."

158. Based on these disclosures of Olmi, a person of ordinary skill in the art would have had good reason to implement such a feature in a method/system like that described in O'Sullivan. In fact, Olmi explains that such a feature is beneficial for both the driver and the rider because, for example, it provides "[f]or speed and

simplicity” because “no money is exchanged in the vehicle.” (*Id.*; *see also* EX1005, 20 (“this will speed up journeys and will make travel more streamlined and convenient”).) A person of ordinary skill in the art would have understood that such a feature would have improved the ride experience by simplifying the associated processes.

159. In my opinion, based on O’Sullivan and Olmi’s teachings as well as knowledge of a person of ordinary skill in the art, such a person would have had a reasonable expectation of success implementing such a feature because, for example, Olmi explains that the ride fare charging process may be conducted by using known methods, such as “credit[ing] the driver’s monetary account with his fee and debits the passenger’s monetary account by an amount which represents the fare for his journey.” (EX1005, 46). Accordingly, a skilled person would have appreciated that the above-described combination would have merely leveraged a combination of known and existing prior art technologies (e.g., transport systems and automatic financial transactions) according to known methods (e.g., known financial systems and processes for charging and debiting accounts). Such a modification would have predictably resulted in an O’Sullivan-Olmi combination including a shared transport system that provides an improved transport system with automated financial transactions.

2. Claim 2

- i) **The method of claim 1, wherein: the pick-up request is for at least one person; and**
- ii) **the method further comprises:**
 - (1) **determining one or more of (i) whether the at least one person is remote from the pick-up location or (ii) whether an alternative pick-up location is located near the pick-up location; and**
 - (2) **in response to determining one or more of that the at least one person is remote from the pick-up location or that an alternative pick-up location is located near the pick-up location, one or more of (i) modifying the pick-up location to be the alternative pick-up location, or (ii) causing the transport user device to display, via the transport user application, navigation directions to the pick-up location based on GPS position data of the transport user device.**

160. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests these limitations. As I discussed for limitation [1.a/11.a.iii/19.a] above, O’Sullivan discloses that “the pick-up request” is for a rider/person 10.

161. O’Sullivan also discloses the remaining limitations of claim 2. **First**, O’Sullivan discloses “determining one or more of (i) whether the at least one person is remote from the pick-up location.” For example, O’Sullivan’s system determines “from the Rider’s GPS Phone 11 that the **Rider is positioned within a certain proximity to the Pick-up Point.**” (EX1006, [0077]; *see also id.*, [0088]) (“When the Driver 13 approached the Rider Destination, and possibly at points along the

way, the Rider 10 and Driver 13 could be polled for their location information to verify that the ride was progressing (“Continuous Co-ordinated Proximity” elements and methods of which are illustrated in FIGS. 10 a and 10 b.”), [0113] (“for the purposes of establishing a shared transport network, it is useful to **establish a network of pick-up and drop-off points (nodes), so that Riders and Drivers can be guided to places that are safe and convenient** and comfortable for both the Riders and Drivers.”).)

162. **Second**, O’Sullivan discloses “in response to determining one or more of that the at least one person is remote from the pick-up location or that an alternative pick-up location is located near the pick-up location, one or more of (i) modifying the pick-up location to be the alternative pick-up location.” For example, O’Sullivan’s system may “direct[] Rider to an **alternate nearby optimal Pick-up Point** in order to maximize transport efficiency... if the Rider made a request on an infrequently used street, the Rider may be directed to walk a block or two to a Pick-up Point where Transport Capacity is available.” (EX1006, [0069] (“The Rider 10, depending upon the mode preferred and the equipment available, can select a Pick-Up Point”), [0074] (“Confirmation is then sent to the Rider 10 via a message which optionally directs Rider to an alternate nearby optimal Pick-up Point in order to maximize transport efficiency. For example, if the Rider made a request on an

infrequently used street, the Rider may be directed to walk a block or two to a Pick-up Point where Transport Capacity is available.”.) .

3. Claim 3

- i) **The method of claim 1, further comprising: causing the transport provider device to display, via the transport provider application, an estimated time associated with arrival of the transport provider at the pick-up location.**

163. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 3 limitations. For example, O’Sullivan discloses “[a]t the time of the **Three Minute Warning**” (which a person of ordinary skill in the art would have understood that such disclose corresponds to “an estimated time associated with arrival of the transport provider at the pick-up location”), a message is “sent to the Driver Software Interface and the Rider(s) with the information pertinent to the pick-up destination and the Riders.” (EX1006, [0076] (“At the time of the Three Minute Warning, a message is sent to the Driver Software Interface and the Rider(s) with the information pertinent to the pick-up destination and the Riders. The Driver Software Interface then guides the Driver, optimally through audible cues, directly to the Pick-up Point.”).)

4. Claim 4

- i) The method of claim 3, wherein the estimated time associated with arrival of the transport provider at the pick-up location includes one or more of an estimated time of arrival of the transport provider at the pick-up location or an estimated time remaining until arrival of the transport provider at the pick-up location.**

164. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests limitations of claim 4 for the reasons discussed for claim 3. A person of ordinary skill in the art would have understood that a “Three Minute Warning” corresponds to “an estimated time remaining until arrival of the transport provider at the pick-up location.” (EX1006, [0076].)

5. Claim 5

- i) The method of claim 1, further comprising: causing at least one of the transport user device or the transport provider device to display, via the transport user application or the transport provider application, respectively, an interface configured to generate, transmit, and receive messages to and from an other of the at least one of the transport user device or the transport provider device, wherein contact information of the transport user and of the transport provider are anonymized.**

165. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 5 limitations. For example, O’Sullivan discloses a “rider/driver proxy messaging system” that enables the driver and the rider to

communicate via their respective devices (and corresponding software interface), where the “Riders/Drivers remain anonymous.” (EX1006, [0082].)

Although **Riders/Drivers remain anonymous**, system rankings are available, and Riders have the ability to only request Transport Capacity from Drivers with specified quality Star Ratings, and the like.

(EX1006, [0082]; *see also id.*, [0101], [0102] (“FIG. 13 shows a message proxy system that would enable communications between members of the community without losing this identity”), [0103] (describing “rider/driver proxy messaging system”).)

6. Claim 7

- i) **The method of claim 1, further comprising: monitoring the progress of travel of the transport provider along the route from the pick-up location to the drop-off location for anomalies, wherein the shared transport system is configured to transmit an anomaly notification to one or more of the transport user device, the transport provider device, or one or more devices associated with safety personnel in response to detection of an anomaly in the progress of the travel of the transport provider.**

166. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 7 limitations. For example, O’Sullivan explains that “[i]n order to improve on the quality of this trust, and to provide security assurance to Riders and Drivers, certain behaviors would **prompt alert conditions**, especially

those related to security or safety.” (EX1006, [0091].) “[F]or example, automated phone calls to verify the intent of the Rider & Driver, including **prompting the Rider or Driver for verification of pass codes** (‘Favorite Color’) which would be established upon user registration.” (*Id.*) “If a Rider or Driver was unable to verify their Favorite Color, **human intervention and responses and queries** (from Network Operators, optimally, at a Network Operations Center (15), as shown in FIG. 1) **could escalate the situation response** as appropriate, even initiating vehicle tracking and dispatching security personnel if appropriate.” (*Id.*)

7. **Claim 10**

- i) **The method of claim 1, further comprising: transmitting a transport user rating prompt to the transport provider device, the transport user rating prompt soliciting the transport provider to provide a rating value for the transport user via the transport provider application;**
- ii) **receiving the rating value for the transport user from the transport provider device via the transport provider application; and**
- iii) **updating the transport user rating score of the transport user based on the received rating value for the transport user.**

167. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 10 limitations. For example, O’Sullivan discloses:

at the end of the driver's journey, as they stop their vehicle,
they would be automatically **prompted to rate the**

Rider(s) that they had carried on their Supply Route.

Using the same or similar criteria, they would **provide their feedback to the system** about the rider. A sufficiently low rating would probably also prompt more requests for information, such as why the rating was so low.

(EX1006, [0093]; *see also id.*, [0094] (“Such an automatic feedback system would help police the network for bad behavior and thus encourage more responsible behavior on the part of everyone using the network.”), [0163] (disclosing that “transport provider device” may be used to “update trust ratings on transport users”); *see also id.*, [0025], [0092], [0146], [0243].) O’Sullivan also discloses that its system “refin[s] trustability ratings” and “**continuously update[s] transport provider and transport user ratings.**” (*Id.*, [0181].)

8. Claim 12

- i) **The system of claim 11, wherein: the pick-up request is for at least one person; and**
- ii) **the operations further include:**
 - (1) **determining one or more of (i) whether the at least one person is remote from the pick-up location or (ii) whether an alternative pick-up location is located near the pick-up location; and**
 - (2) **in response to determining one or more of that the at least one person is remote from the pick-up location or that an alternative pick-up location is located near the pick-up location, one**

or more of (i) modifying the pick-up location to be the alternative pick-up location, or (ii) causing the transport user device to display, via the transport user application, navigation directions to the pick-up location based on GPS position data of the transport user device.

168. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 12 limitations for the same reasons discussed for claim 2.

9. Claim 13

- i) The system of claim 11, wherein: the operations further include causing the transport provider device to display, via the transport provider application, an estimated time associated with arrival of the transport provider at the pick-up location; and**
- ii) the estimated time associated with arrival of the transport provider at the pick-up location includes one or more of an estimated time of arrival of the transport provider at the pick-up location or an estimated time remaining until arrival of the transport provider at the pick-up location.**

169. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 13 limitations for the same reasons discussed for claim 3.

10. Claim 14

- i) The system of claim 11, wherein the operations further include: causing at least one of the transport user device or the transport provider device to display, via the transport user application or the transport provider application, respectively, an interface configured to generate, transmit, and receive messages to and from an other of the at least one of the transport user device or the transport provider device, wherein contact information of the transport user and of the transport provider are anonymized.**

170. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 14 limitations for the same reasons as discussed for claim 5.

11. Claim 15

- ii) The system of claim 11, wherein the operations further include:**
 - (1) determining that the transport provider has failed to pick up the at least one person or item; and**
 - (2) in response to determining that the transport provider has failed to pick up the at least one person or item, re-allocating the pick-up request to a different transport provider so as to replace the transport provider with the different transport provider.**

171. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests claim 15 limitations. For example, O’Sullivan discloses “tracking the pick-up and delivery of the transport demand by the transport capacity.” (EX1006, [0186].) If there is “**a missed pick-up,**” the system may “**automatically**

re-allocat[e] and **reschedul[e]** a missed pick-up to **other available transport capacity** in the registry of transport.” (*Id.*, [0187])

12. Claim 20

- i) The non-transitory computer readable medium of claim 19, wherein the operations further include: transmitting a transport user rating prompt to the transport provider device, the transport user rating prompt soliciting the transport provider to provide a rating value for the transport user via the transport provider application;**
- ii) receiving the rating value for the transport user from the transport provider device via the transport provider application; and**
- iii) updating the transport user rating score of the transport user based on the received rating value for the transport user.**

172. In my opinion, O’Sullivan (including as modified above) discloses and/or suggests limitations of claim 20 for the same reasons discussed for claim 10.

X. CONCLUSION

173. I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated: March 11, 2026

By: 

Petros Ioannou, Ph.D.