

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORP. AND KIA CORPORATION,
Petitioners,

v.

EMERGING AUTOMOTIVE LLC,
Patent Owner

Case IPR2024-00981
U.S. Patent 9,365,188

**DECLARATION OF DR. SAM MALEK IN SUPPORT OF PATENT
OWNER'S PRELIMINARY RESPONSE**

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I, Dr. Sam Malek, declare under penalty of perjury as follows:

I. INTRODUCTION AND BACKGROUND

1. I have been retained as an expert witness on behalf of Emerging Automotive LLC (“Emerging Auto”) to provide information and assistance regarding U.S. Patent No. 9,365,188 (“the ’188 patent”). Specifically, I have been asked to consider the Petition for Inter Partes Review numbered IPR2024-00981 (“the Petition”) regarding the ’188 patent, and specifically the Declaration of Dr. Almeroth (EX1003) that accompanies the Petition.

2. In this declaration I provide my independent analysis of the ’188 patent in light of the materials cited below and discussed herein and my knowledge and experience in this field during the relevant time frame. I have been asked to consider what one of ordinary skill in the art at the time of the invention of the ’188 patent (a “POSITA,” see Section V below) would have understood from the specification, including scientific and technical knowledge related to the patent. I have also been asked to consider whether certain references would have rendered obvious the inventions described in the claims of the ’188 patent.

3. My findings, as explained below, are based on my study, experience, and background in the fields discussed below, informed by my education and my extensive experience in the field of cloud-based processing systems. I have also relied on my review and analysis of the references identified by Dr. Almeroth,

information provided to me, and information that I have independently reviewed. I have personal knowledge of the facts and opinions set forth in this declaration, and, if called upon to do so, I would testify competently thereto.

4. I am being compensated for my independent analysis as an expert with respect to this inter partes review proceeding. My compensation is not contingent in any way on the content of my analysis, the opinions that I offer, or the outcome of this proceeding. I have no financial interest in either Petitioner (Toyota or Kia) or Patent Owner (Emerging Auto) and I have no financial interest in the '188 patent.

II. QUALIFICATIONS

5. My qualifications for forming the opinions given in this declaration are summarized here and are addressed more fully in my curriculum vitae, which is submitted as EX2002. That exhibit also includes a list of my publications.

6. I have approximately 25 years of experience in the general area of computer and software technology in a variety of roles, including as a software engineer, software architect, and programmer at a variety of companies, as well as a researcher and professor at several universities.

7. I am currently a Full Professor of Software Engineering with tenure in the Informatics Department within the School of Information and Computer Sciences at the University of California, Irvine. I am also the Director of the

Software Engineering and Analysis Laboratory (“SEAL”). My general research interests are in the field of software engineering, and to date my focus has spanned the areas of software analysis and testing, mobile computing, architecture and design, and software dependability and security. The underlying theme of my research has been to devise techniques and tools that aid with the construction, analysis, and maintenance of largescale software systems.

8. I received my Ph.D. and M.S. degrees in Computer Science from the University of Southern California and my B.S. degree in Information and Computer Science from the University of California, Irvine. I have received numerous awards for my research contributions, including the Test of Time Award from the Association for Computing Machinery Special Interest Group on Software Engineering (2020), National Science Foundation CAREER award (2013), GMU Emerging Researcher/Scholar/Creator award (2013), and the GMU Computer Science Department Outstanding Faculty Research Award (2011).

9. I have authored over 130 peer-reviewed research publications. These publications have been highly cited (more than 11,000 times according to scholar.google.com). Many of my publications have dealt with the topics that are related to this proceeding, including distributed software systems, cloud computing, client-server architecture, and software settings and configuration. I provide a few examples here.

10. My Ph.D. dissertation resulted in novel algorithms for optimizing the deployment architecture of a distributed software system. The deployment architecture of a distributed software system is the allocation of its software components to its hardware devices. There are many deployments of a software system possible, but some may be superior to others with respect to certain quality of service objectives (e.g., latency, availability, security). One application of my dissertation work was in the context of cloud computing, because in most cloud-based software systems there are many geographically distributed nodes (servers) available for the deployment of software components.

11. I have also worked on techniques to leverage cloud computing for software testing. For instance, in an article titled “A Whitebox Approach for Automated Security Testing of Android Applications on the Cloud,” I showed how the resources in the cloud can be effectively harnessed to facilitate security testing at scale.

12. In another article titled “GLIDE: A Grid-based Lightweight Infrastructure for Data-intensive Environments,” I described the results of my work with colleagues from NASA in the development of a new distributed software system for sharing large amounts of data generated by NASA. This capability was the first of its kind in the realm of Grid Computing, which is a precursor to Cloud Computing.

13. A significant focus of my work has been on computer security, including electronic forms of access control and management of privileges in software systems. For instance, I led a team of researchers in a project sponsored by the Defense Advanced Research Project Agency (DARPA) to develop a novel approach for protecting Android applications from various form of access control attacks. The project resulted in the development of a tool called COVERT. I have published extensively on this work, including a highly cited manuscript that appeared in the IEEE Transactions on Software Engineering in 2015. In another project, I developed DelDroid, which at the time was the first approach for automated determination and enforcement of least privilege architecture in Android. This work was published in the Journal of Systems and Software in 2019.

14. I have received numerous research grants from a variety of organizations, including the National Science Foundation (NSF), Federal Bureau of Investigation (FBI), Air Force Office of Scientific Research, Department of Homeland Security (DHS), National Security Agency (NSA), Defense Advanced Research Projects Agency (DARPA), Office of the Director of National Intelligence, and Army Research Office among others. Software systems and results produced in my research lab have been adopted for use by various organizations in both private (e.g., Boeing, Bosch) and public (e.g., NASA, DHS, FBI) organizations. Many of the above-mentioned projects and software systems involved analysis and design of

client-server software systems deployed on the cloud. For instance, in a project called “RASS: Resilient Autonomic Software Systems” funded by Air Force Office of Scientific Research, I led a team of researchers to develop a new method of automatically adapting Air Force’s software systems to fluctuations in communication networks, thereby making them resilient to network interruptions.

15. I also have several years of experience as a software engineer, software architect, and programmer at a variety of companies, namely the Boeing Company, PricewaterhouseCoopers Consulting (later acquired by International Business Machines (“IBM”) Corporation), FieldCentrix, and Neural Computing Systems Lab. During my tenure in the industry, I gained professional experience in the design, development, and management of largescale software engineering efforts. Among the software systems that I designed and developed were commercial ecommerce and enterprise software systems. Many of the software systems developed in the context of my professional experience were built according to the general client-server architectural style and deployed on the cloud or cloud-like environments. In most of these systems, the server held the state of the distributed application, allowing for that state, such as the preferred user settings, to be transferred to client at runtime.

16. I have taught software engineering and computer science courses on a regular basis at the B.S., M.S., and Ph.D. levels at the universities where I have been

employed. I cover concepts related to cloud computing, distributed software, client-server architectural style, authentication, encryption techniques, access control mechanisms, and protocols for exchange of electronics credentials (e.g., electronic keys, passwords, and tokens) in many of the courses that I teach at the university. Notably, I have regularly taught distributed software engineering courses at UC Irvine and previously at George Mason University (GMU). In these courses, I cover concepts such as the client-server architectural style, cloud computing principles, and server-side storage of user-defined preferences.

17. I have been a frequent speaker at scientific conferences, symposia, workshops, and gatherings of software engineering academics and professionals. I have served as chair, committee member, and reviewer for numerous software engineering journals, magazines, and conferences. I have served on the editorial board of the ACM Transactions on Software Engineering and Methodology, IEEE Transactions on Software Engineering, the ACM Transactions on Autonomous and Adaptive Systems, the Springer Journal of Automated Software Engineering, and the Springer Journal of Computing. I am a member of the Association for Computing Machinery (ACM), ACM Special Interest Group on Software Engineering (SIGSOFT), and the Institute of Electrical and Electronics Engineers (IEEE). I have testified at trial and deposition as an expert witness in numerous cases in the past five years.

III. MATERIALS CONSIDERED

18. In preparing this declaration and forming my opinions, I have considered: the claims, specification, and prosecution history of the '188 patent; the Petition and declaration by Dr. Almeroth (including all materials cited in each); and all materials cited and discussed in this declaration. In addition, I have considered the relevant legal standards, as they have been explained to me by counsel and as I understand them. I have also considered the knowledge and understanding of a person of ordinary skill at the time of the invention of the '188 patent, of which I am familiar. As part of my analysis for this matter, I have also considered my own knowledge and experience, including my work and experience with cloud-based processing systems.

IV. LEGAL PRINCIPLES

19. In forming my opinions here, I have applied the following understanding of certain legal concepts related to anticipation, obviousness, combinations of references, and knowledge of one of ordinary skill in the art. Counsel for Patent Owner has informed me of legal principles that apply in this proceeding.

20. It is my understanding that assessing the validity / patentability of a U.S. patent claim based on a prior art analysis requires two essential steps. First, one must analyze the terms of the patent claims to understand what meaning one of

ordinary skill in the art would give the terms. Second, one may then assess validity by comparing a patent claim to the “prior art.” I understand that the teaching of the prior art is viewed through the eyes of a person of ordinary skill in the art at the time the invention was made. My opinion as to what constitutes a relevant person of ordinary skill in the art is set forth below.

21. I have been informed that in order for a patent claim to be invalid as anticipated by a prior art reference under 35 U.S.C. § 102, each and every element of that patent claim must be found disclosed in that reference, explicitly or inherently, to a person of ordinary skill in the art. Inherent disclosure requires that the claimed element be the only possible option given the other disclosures of the reference, and that it would be so recognized by persons of ordinary skill in the art. I also understand that the missing descriptive material cannot merely be probably or possibly present. If any single element of a claim is not disclosed in the reference, the entire claim is not anticipated. I understand that a prior art reference merely capable of being modified so as to operate in the same manner as the patented device or system does not anticipate. I further understand that obviousness is not inherent anticipation, and that it is insufficient that a missing limitation is so similar to a limitation actually disclosed in the reference that one of ordinary skill in the art would see the substitution as obvious. I also understand that, if it is necessary to reach beyond the boundaries of a single reference to provide missing disclosure of

the claimed invention, the proper ground for asserting invalidity is not anticipation, but obviousness.

22. I understand that a claim is invalid as obvious under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art.

23. I understand that a person of ordinary skill in the art provides a reference point from which the prior art and the claimed invention should be viewed. This reference point prevents one from using his or her own insight or hindsight in deciding whether a claim is obvious.

24. I have been informed that the following factors are used to determine whether or not the claimed subject matter would have been obvious: (i) the scope and content of the prior art; (ii) the differences between the prior art and the claimed invention; (iii) the level of ordinary skill in the field of the invention; and (iv) any relevant objective considerations of non-obviousness, such as commercial success, long-felt but unresolved needs, failure of others, etc.

25. I also understand that in considering the scope and content of the prior art, references must be reasonably related (i.e., analogous) to the claimed invention of that patent. I understand that the test for determining whether a prior art reference constitutes analogous art to the claimed invention is (1) whether the reference is from

the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference is still reasonably pertinent to the particular problem the inventor is trying to solve.

26. I understand that a party asserting obviousness based on a combination of prior art references must demonstrate that one of ordinary skill in the art would have been motivated to combine the teachings of those references to achieve the claimed invention and that the skilled artisan would have had a reasonable expectation of success in doing so. It is my understanding that it is not enough to show that one skilled in the art could combine elements of multiple references, but instead there must be some reason that would have prompted a person of ordinary skill in the art to combine the elements in the way the claimed invention does. I understand that there must be some reasoned explanation as to why one of ordinary skill in the art would combine the references. The reason cannot come from hindsight.

27. I understand that in considering whether a claimed invention is obvious, one may but is not required to find obviousness if at the time of the claimed invention there was a reason that would have prompted a person having ordinary skill in the field of the invention to combine the known elements in a way the claimed invention does, taking into account such factors as: (1) whether the claimed invention was merely the predictable result of using prior art elements according to their known

function(s); (2) whether the claimed invention provides an obvious solution to a known problem in the relevant field; (3) whether the prior art teaches or suggests the desirability of combining elements claimed in the invention; (4) whether the prior art teaches away from combining elements in the claimed invention; (5) whether it would have been obvious to try the combinations of elements, such as when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions; and (6) whether the change resulted more from design incentives or other market forces. To find it rendered the invention obvious, the prior art must provide a reasonable expectation of success. Obvious to try is not sufficient in unpredictable technologies.

28. I understand that each claim must be evaluated separately for obviousness, and that it is improper to use hindsight. I understand that the disclosures in a patent or a prior art reference are viewed from the perspective of a person of ordinary skill in the art at the time of the invention. The obviousness analysis by a person of ordinary skill in the art must consider only what was known at the time of the invention.

29. It is my further understanding that obviousness cannot be based on a hindsight combination of components selected from one or more prior art references. I also understand that an invention would not have been obvious simply because all of the elements of the invention may have been known separately in the prior art.

30. I understand that a combination of disclosures or references would not have been obvious if the alleged modification(s) to be made to the reference(s) would have been inconsistent with the reference's stated goals or would have rendered the combination inoperable for its intended purpose. I further understand that for something to have been obvious, the party asserting obviousness must explain why a POSITA would have selected components or features for combination in the manner claimed.

31. I have been informed that a prior art reference must be considered in its entirety, i.e. as a whole, including portions that would lead away from the claimed invention.

32. I understand that with respect to claim construction, the proper construction is considered in the context of, and must be consistent with, the specification and that the claim language should be read in light of the specification and file history as it would be interpreted by one of ordinary skill in the art.

V. PERSON OF ORDINARY SKILL IN THE ART ("POSITA")

33. Counsel for Patent Owner has informed me that a person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. In my opinion, the relevant field of art for the '188 patent is that of cloud-based processing systems.

34. For the purpose of this Declaration, and based on my opinions herein, the time of invention for the '188 patent is April 2011. However, I understand that Dr. Almeroth opines that the time of the invention is October 2013. Any invention date from the early-to-mid-2010s would not alter my opinion regarding a person of ordinary skill in the art. Thus, my opinion regarding a POSITA applies to either a date of invention in April 2011 or a date of invention in October 2013.

35. I have been informed by counsel for Patent Owner that the person of ordinary skill is generally familiar with the type of problems encountered in the field and the prior art solutions to those problems and possesses an ordinary level of creativity.

36. I understand that Petitioners' expert, Dr. Almeroth, opined that a person of ordinary skill in the art would have "had at least a four-year undergraduate degree in electrical engineering, automotive engineering, or a closely related field and at least two years of experience in the fields of access control systems, vehicle electronics, and/or cryptography. Additional education could substitute for professional experience and vice versa. A person of ordinary skill in the art would also be able to understand and apply the prior art discussed herein." EX1003, Almeroth Decl., ¶ 79.

37. For purposes of this declaration, I apply Dr. Almeroth's definition. However, I note that the opinions I set forth below are applicable under any

reasonable definition of a POSITA. I also note that I qualify as a POSITA under Dr. Almeroth's proposed definition.

VI. BACKGROUND

A. Overview of the '188 Patent

38. United States Patent Number 9,365,188 (the "'188 patent") is titled "Methods and Systems for Using Cloud Services to Assign E-Keys to Access Vehicles." EX1001, Face Page. The '188 patent "relates to systems and methods for generating and sharing electronic keys (e-Keys) with users and cloud-based processing systems." *Id.* at 1:33-35, 1:54-63.

39. The '188 patent describes providing vehicle access to individuals, including an owner or "guest driver," such as a friend, spouse, or valet, by an e-key, which allows the holder of the e-key to use the vehicle. *Id.* 8:40-54. An e-key may be sent from a vehicle owner to another person, such as a guest driver. *Id.* 8:54-63. In addition to allowing use of the vehicle, the e-key can further include conditions of use of the vehicle, which define one or more privileges associated to the use of the e-key, including speed limits, geographic restrictions, amount of time, etc. *Id.*; *see also id.*, 2:27-31, 3:35-39. For example, with an e-key, "the vehicle can be loaned to a child of driving age ... and the child can be provided with restricted use of the vehicle." *Id.* at 12:58-60. The '188 patent describes

creating profiles for users that have privileges set by an administrator. *Id.* at 15:11-24.

40. For example, accounts for a driver may be created with “defined roles,” which can “include a set of privileges,” such as speed limit or geographic privileges. *Id.* at 34:28-39. In this way, logins of user profiles can be dynamically controlled. For example, “[a]dministrators can decide which settings are locked for specific logins or roles, which are open for the login user to toggle and which settings are to be enforced.” *Id.* at 15:25-33. “[U]se of the vehicle can be restricted to predefined rules,” including those based on the user profile. *Id.* at 20:23-27.

41. As claimed, the owner or administrator’s request to generate an e-key is “receiv[ed], by a server ... from a user via a user account that has a vehicle associated therewith” and “the request includes a condition of use of the vehicle as set by the user by the user via the user account.” *Id.* at claims 1, 16 and 19. The e-key is then “generat[ed], by the server ... the e-key being assigned with the condition of use of the vehicle.” *Id.*

B. Prosecution History of the ’188 Patent

As part of my analysis, I reviewed the file history of the ’188 patent. The applicants filed the application for the ’188 patent on June 12, 2014. EX1002, 254. The applicants submitted an information disclosure statement (“IDS”) identifying the same *Zaid* reference asserted in the Petition and cited by Dr. Almeroth.

EX1002, at 84. The Primary Examiner for the prosecution of the '188 patent, Yalkew Fantu, considered *Zaid*, and signed an IDS attesting to that fact. EX1002, at 52. Examiner Fantu also initiated and conducted an interview with the applicants. EX1002, 21. Examiner Fantu cited application number 14/063,638, patented as U.S. Patent No. 9,189,900 (the "'900 patent"), as presenting a potential obviousness double patenting issue. EX1002, 21. The applicants agreed to amend claim 1 and file a terminal disclaimer to overcome a potential obviousness double patenting rejection. EX1002, 21, 61. Examiner Fantu approved the applicants' amendments, the terminal disclaimer, and signed an IDS indicating he considered the *Zaid* reference. EX1002, 17, 52. The Examiner allowed the claims, identifying "two references, Teramura and Shiim, are the closest prior art of record." *Id.*

VII. SUMMARY OF ZAID (EX1008)

42. United States Publication Number 2011/0112969 by Zaid et al. (EX1008, "Zaid") is titled "Vehicle Access Control Services and Platform."

43. The inapplicability of *Zaid* is manifest in the reference itself. Unlike the independent patent claims, *Zaid* does not involve any request to a server to generate an e-key. Instead, *Zaid* describes a "vehicle reservation," which can be made after a Facebook or other social networking site account holder logs into their account and views an advertisement of this vehicle available for rent.

EX1008, ¶ 72. Once the renter makes the reservation, that reservation is relayed as

an encrypted message. EX1008, ¶¶ 125-27. Zaid does not suggest that this relayed reservation message is the generation of an e-key. Instead, the encryption disclosed by Zaid merely converts the message from one form to another. The vehicle reservation described by Zaid also does not suggest or teach a request to generate an e-key. EX1008. Zaid does not disclose or suggest any user account that has a vehicle associated therewith, wherein the user can set a condition of use of the vehicle via that user account nor any user account via which the user can submit a request to generate an e-key.

VIII. DETAILED ANALYSIS OF PETITION GROUNDS

44. As I describe in detail below, it is my opinion that Dr. Almeroth and the Petition fail to demonstrate any reasonable likelihood of success that any claim of the '188 patent is invalid.

A. Dr. Almeroth and the Petition fail to show that Kleve discloses or suggests “a request ... to generate an electronic key (e-key) ... the request includes a condition of use of the vehicle as set by the user via the user account.”

45. Claims 1, 16 and 19 of the '188 patent include at least the following two limitations: “receiving, by the server, a request from a user via a user account ... to generate an electronic key” and that “the request includes a condition of use of the vehicle as set by the user via the user account.” EX1001, claim elements 1[a], 16[a], and 19[a]. In my opinion, Dr. Almeroth does not demonstrate that a

POSITA would have understood Kleve to disclose or suggest any request to generate an e-key that includes a condition of use of the vehicle as set by the user via the user account.

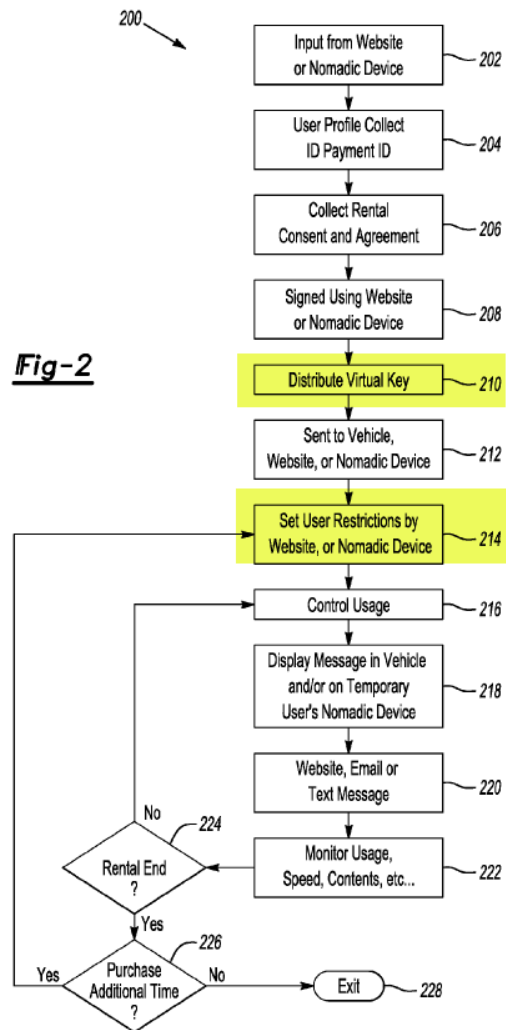
46. For this claimed requirement, Dr. Almeroth states “[s]pecifically, after ‘the vehicle Owner ... ha[s] already setup a user profile within the database’ and after the vehicle Owner and Temporary User have ‘agreed to the rental agreement,’ ‘[a]t step 502, the vehicle Owner may enter in vehicle authorization credentials based on information received by the Temporary User **to set up a virtual key.**’” EX1003, ¶ 107 (citing EX1004, ¶ 62) (emphases in original). Dr. Almeroth states that “[t]he entering of this information is a **request sent by the user** to generate a virtual key.” *Id.* (citing EX1004, ¶¶ 62-63, Figure 5) (emphases in original).

47. Dr. Almeroth further states that “Kleve describes numerous restrictions that are associated with the rental agreement, including the ‘rental period,’ ‘what can and cannot be transported,’ ‘speed, global position coordinates, or load weight restrictions,’ ‘destination location,’ ‘prohibited areas where the owner does not want their vehicle to be used,’ and ‘top vehicle speed, limiting the cargo load, and alerting the vehicle owner if the driver enters an area deemed to be prohibited by the owner.’ EX1003, ¶ 119 (citing EX1004, ¶¶ 38, 40, 51, 73, 75).

48. Dr. Almeroth opines that “Kleve discloses that such restrictions are sent with the request to generate a virtual key. Specifically, Kleve discloses that the

virtual key ‘enable[s] the keyless drive system for the appropriate Temporary User **during a given rental period,**’ which indicates that rental agreement restrictions were sent with the request so that the virtual key could be associated with said restrictions.” EX1003, ¶ 120 (citing EX1004, ¶¶ 39, 68) (emphases in original). But these portions of Klevé demonstrate that the ability to “set user restrictions,” at step 214, occurs only *after* step 210, which “distribute[s] virtual key” and *after* step 212, wherein the virtual key may be “sent to vehicle, website or nomadic device.” EX1004, Figure 2, ¶¶ 39, 68, Figure 5.

49. A POSITA would understand that because *Klevé* discloses the ability to “set user restrictions” after the step in which the virtual key is distributed and after the step in which the virtual key is “sent to vehicle, website or nomadic device,” none of the “restrictions” (alleged as conditions of use)—set after the virtual key has already been distributed—would or could be included in a request to generate an e-key. *Id.*, Figure 2, ¶¶ 39, 40. *Klevé* instructs that it is only “[a]t step 214 [that] the Owner may have access to control usage of the vehicle being rented by the Temporary User. The Owner may set user restrictions by use of the website or nomadic device.” *Id.*, ¶ 40. Step 214, *Klevé* explains, occurs after “step 210 – distribute virtual key,” and therefore a POSITA would not conclude that “restrictions were sent with the request” as Dr. Almeroth contends.



EX1004, Figure 2 (highlighting step 210 – showing existence of virtual key at time of distribution—and step 214 – showing ability to “set user restrictions” after virtual key’s distribution).

50. Dr. Almeroth identifies Kleve’s paragraph 39, and particularly the virtual key being “sent to the vehicle ... during a given rental period,” as alleged support for his opinion that “rental agreement restrictions were sent with the request so that the virtual key could be associated with said restrictions.” EX1003,

¶ 120 (citing EX1004, ¶¶ 39, 68). However, Kleve offers no such suggestion, and in fact paragraph 39 details specific steps of Figure 2, which, as depicted in the highlighted Figure above, show that the identified “virtual key” already exists when it is “sent to the vehicle” (step 212) and therefore cannot be the claims’ recited “request” which precedes the claims’ recited “generating” of the e-key. EX1004, ¶ 39, Figure 2.

51. Dr. Almeroth’s reliance on Kleve paragraph 68 also fails to support his opinion that “Kleve discloses that such restrictions are sent with the request to generate a virtual key,” and in fact, Kleve contradicts this conclusion. EX1003, ¶ 120; EX1004, Figure 5, ¶¶ 66, 68. First, paragraph 68 describes specific steps of Figure 5, specifically steps 510 and 512, which Kleve describes as steps that occur *after* step 502. EX1004, Figure 5, ¶¶ 62, 68. It is step 502—when a vehicle owner enters the renter’s “credential”—that Dr. Almeroth alleges to be the claims’ recited “request ... to generate an [] e-key.” EX1003, ¶ 107 (citing EX1004, ¶¶ 62-63, Figure 5) (“at step 502, the vehicle owner may enter in vehicle authorization credentials ... to set up a virtual key ... [t]he entering of this information is a **request sent by the user** to generate a virtual key”). Kleve offers no teaching or suggestion in paragraph 68 that entering the “credential” at step 502 includes any “condition of use of the vehicle.” *Id.*; *see also id.*, ¶ 68. Indeed, Kleve teaches away from the suggestion that this entering a “credential” at step 502 “includes” a

“given rental period” as Dr. Almeroth contends. *Id.* Kleve shows instead that at step 506—after the “credential” is entered by the vehicle owner—it is “at rental time” that the “vehicle owner (VO) sends credential to vehicle.” EX1004, Figure 5, ¶ 66 (“[w]hen the scheduled rental period of time begins the vehicle Owner may send the credentials to the vehicle ...”). If entering the credential is alleged to be the recited “request ... to generate an [] e-key,” as Dr. Almeroth states, then Kleve’s disclosure of a vehicle owner sending the credential to the vehicle would not or could not be included in that “request,” as Kleve teaches that the “credential” is sent to the vehicle *after* step 502, and Figure 5 teaches that this credential is sent “at rental time.” *Id.*; *see also id.*, ¶¶ 62, 68.

52. Kleve’s disclosure of a credential being sent to the vehicle at rental time, e.g., “to enable the keyless drive system for the appropriate Temporary User during a given rental period,” does not teach or suggest the independent claims’ recited “request ... to generate an [] e-key ... the request includes a condition of use of the vehicle ...” EX1001, claims 1, 16, 19

53. I disagree with Dr. Almeroth’s proposed modifications of *Kleve* to include “conditions in the request, so that the generated virtual key is associated with such restrictions, *allowing the restrictions to be monitored and enforced.*” EX1003, ¶ 121 (citing EX1004, ¶¶ 40-43). A POSITA would not be motivated to make this modification, as Dr. Almeroth contends, since such a modification

makes no sense, since *Kleve* already allows the owner to “control usage” and “monitor usage, speed, contents, etc.” EX1004, Fig. 2 (“Step 216” and “Step 222”), ¶¶ 40 (“[a]t step 216, the control parameters use may be monitored...”), 41 (“[a]t step 222, control use may limit the Temporary User from exceeding the restrictions the Owner has set”).

54. I also disagree with Dr. Almeroth’s proposed motivation to modify *Kleve* to allow the virtual key to be *associated* with the restrictions. To have the virtual key of *Kleve* *associated* with the user restrictions does not disclose “the request includ[ing] a condition of use of the vehicle,” as Dr. Almeroth concludes. A request to generate a virtual key and a request containing restrictions for a virtual key can be received in two messages (which is already disclosed in *Kleve*). EX1004. Therefore, even if it would have been obvious to modify *Kleve* as Dr. Almeroth contends, the modification would still fail to suggest the recited independent claim elements. And, regardless, as I have described above, such a modification would not have been obvious.

B. Dr. Almeroth and the Petition fail to show that *Kleve* discloses or suggests “generating, by the server, the e-key, the e-key being assigned [associated] with the condition of use of the vehicle.”

55. In my opinion, Dr. Almeroth does not demonstrate that a POSITA would have understood *Kleve* to disclose or suggest “generating, by the server, the e-key, the e-key being assigned [associated] with the condition of use of the

vehicle,” as recited by the independent claims of the ’188 patent. As I have described above, the alleged request to generate an e-key does not include the alleged condition of use. For the separate limitation of the server generating “the e-key, the e-key being assigned [associated] with the condition of use of the vehicle,” Dr. Almeroth again relies on Kleve’s disclosure that a virtual key may be “sent to a vehicle configuring the VCS to enable the keyless drive system for the appropriate Temporary User during a given rental period.” EX1003, ¶ 124 (citing EX1004, ¶¶ 39, 63). However, as demonstrated above, Kleve teaches that the virtual key is sent to the vehicle at step 212—a step which precedes step 214—and it is not until step 214, Kleve teaches, that the user “may set restrictions.” EX1004, Fig. 2, ¶ 40 (“[a]t step 214, the Owner may have access to the control usage of the vehicle being rented ... the Owner may set user restrictions by use of the website or nomadic device”).

56. Dr. Almeroth cites to and partially quotes from Kleve, paragraph 63, to support his conclusion that “Kleve discloses or renders obvious a server that generates a virtual key (e-key) and assigns to it the rental agreement restrictions (condition of use of the vehicle), including the rental period.” EX1003, ¶ 124 (citing EX1004, ¶ 63). However, paragraph 63 does not teach or suggest a server that “assigns” “rental agreement restrictions” to an e-key, “including the rental period.” *Id.*; EX1004, ¶ 63.

57. In fact, as described above, Kleve teaches away from this concept. Kleve teaches a system in which information about payment, vehicle make and model, and user ID is inputted (steps 202 and 204), a “rental consent” and agreement is signed (step 206), and then, at step 210, the virtual key is distributed. *Id.*, Fig. 2. Kleve teaches that the virtual key is “generated” before it is distributed. *Id.*, Fig. 2, ¶ 39 (“at step 210, once the Temporary User selects the vehicle, pays the appropriate amount and signs a consent agreement, th[e]n the system may generate a virtual key to distribute”). Afterward, “at step 212,” the virtual key may be sent to a vehicle, website or nomadic device. *Id.* Kleve teaches that a vehicle owner can “set user restrictions” at step 214, a step which is subsequent to Kleve’s generation and distribution of a virtual key. *Id.*; *see id.*, ¶ 40.

58. Also, as I explained above, Kleve does not disclose or suggest any request to generate an e-key, wherein the request “includes a condition of use of the vehicle as set by the user via the user account.” Because Dr. Almeroth and the Petition fail to show any disclosure or suggestion for the antecedent basis for element 1[b], / 16[b] / 19[b], Dr. Almeroth and the Petition likewise fail to teach or suggest a server generating an e-key with the required condition of use of element 1[a].

59. As part of the Petition’s ground 2, Dr. Almeroth adds the Sekiyama reference for alleged disclosure of “*a server that generates an electronic key*”

(EX1003, ¶¶ 186-87), but Dr. Almeroth does not rely on Sekiyama, or otherwise identify any disclosure in Sekiyama, for the alleged teaching of a server generating an e-key “assigned [associated] with the condition of use of the vehicle as set by the user via the user account,” as recited by the independent claims. *Id.* In addition, none of the disclosures of Sekiyama identified by Dr. Almeroth even suggests or discloses any user account, any user account via which a user can request a server to generate an e-key which includes a condition for use of the vehicle, or any suggestion or disclosure of a server generating an e-key assigned [associated] with the condition of use of the vehicle as set by the user via the user account. EX1003, ¶¶ 186-87 (citing EX1005, ¶¶ 18, 26)).

C. The Additional References Do Not Cure the Deficiencies of Kleve.

60. For Grounds 2-3 and 7, Dr. Almeroth proposes adding different references in combination with Kleve. However, Dr. Almeroth only proposes doing so as related to other limitations of the independent claims, than those discussed above, or as related to the dependent claims of the '188 patent. The added references do not cure any deficiencies of Kleve (or Sekiyama) discussed above, and Dr. Almeroth offers no opinion to the contrary.

D. Dr. Almeroth and the Petition fail to show that Zaid, alone or in combination, discloses or suggests a “request from a user via a user account ... to generate an electronic key.”

61. In my opinion, Dr. Almeroth does not demonstrate that a POSITA would have understood Zaid, alone or in combination with Harris, to disclose or suggest a server receiving “a request from a user via a user account ... to generate an electronic key (e-key),” as recited by the independent claims. EX1001, claims 1, 16, 19.

62. Dr. Almeroth identifies Zaid’s server’s receipt of a vehicle reservation as the claimed “request ... to generate an electronic (e-key),” but, as described above, Zaid’s “reservation” is just that—it reserves a vehicle, authorizing a user to thereafter control the vehicle. EX1005, ¶ 124.

63. As I described above, Zaid discloses that a user may book a reservation for a vehicle at a central server, and because the central server does not have direct communication with the vehicle, the reservation information is passed to a wireless communication device through an encrypted message. EX1008, ¶¶ 70, 125. Zaid instructs that first, “a reservation for a vehicle is received from a wireless communication device,” then, “vehicle access is provided based on the reservation.” *Id.*, ¶ 124.

64. A POSITA would understand that the functionality of the server passing along a message regarding a reservation for a vehicle does not suggest or

teach a request received by a server to generate an electronic key for use by the mobile device.

65. Dr. Almeroth contends that “Zaid discloses that the encrypted reservation is an e-key that is sent to the recipient to allow use of the vehicle.” EX1003, ¶ 213. I disagree with Dr. Almeroth’s conclusion. First, Zaid passes along a rental reservation as a “verified communication” to a user, but does not disclose generating an e-key. EX1008, ¶¶ 125-127. Zaid actually confirms that instructions for car entry, such as unlocking doors, are received through direct commands, not just passing through reservation requests. EX1008, ¶ 100. For example, Zaid discloses that after the vehicle receives the reservation, the wireless communication device may send commands to unlock the car. *Id.*

66. Additionally, Dr. Almeroth and the Petition do not demonstrate that Zaid’s use of an encrypted message, relayed by a server, discloses or suggests the generation of an e-key. Instead, Zaid’s teaches that the encrypting and decrypting of data is for “verified communication”—e.g., using encryption to convert a reservation from one form to another.

67. In asymmetric cryptography, such as that discussed in Zaid, an entity has two keys: private key and public key. EX1008, ¶¶ 65-66. Any information encrypted using the private key can be decrypted only using the corresponding public key, and conversely, any information encrypted using the public key can be

decrypted only using the private key. As the names suggest, private keys are intended to be kept secret, while public keys are intended to be shared openly. Asymmetric cryptography can be used to achieve confidentiality or authentication. A message encrypted using an entity's public key is only readable by that entity, since only that entity has the private key to decrypt the message, ensuring confidentiality of that message. A message encrypted using an entity's private key can be read by anyone that has the entity's public key, but ensures the authenticity of that message, because only that entity has the private key to create such a message.

68. Zaid discloses that after receiving a message, the wireless communication device decrypts the first layer of encryption encrypted using the public key of the wireless communication device using a locally stored private key of the wireless communication device. In various embodiments, decryption is used to ensure and authenticate that the intended wireless communication device is receiving the vehicle reservation rather than one that intercepts the vehicle reservation. EX1008, ¶ 126. Zaid is disclosing the wireless device decrypting a received message using its private key, thus ensuring that only the wireless device can read the message and further protecting against a situation in which the message is intercepted by another device. As I discussed above, a POSITA would

not understand this to disclose or suggest a server generating an e-key to use the vehicle, as required by the claims.

E. Dr. Almeroth and the Petition fail to show that Zaid, alone or in combination, discloses or suggests a server receiving “a request from a user via a user account that has a vehicle associated therewith ... to generate an electronic key ... the request includes a condition of use of the vehicle as set by the user via the user account.”

69. Each of the independent claims of the '188 patent require a server receiving a request that is not only “*from* a user via a user account that has a vehicle associated therewith” but also that the request’s inclusion of “a condition of use of the vehicle” must be “set by *the user*” who made the request to generate the e-key and the condition of use must also be set via “*the user account*” from which the request was made. EX1001, claims 1, 16, 19. Therefore, even if Zaid’s reservation could suggest the recited request to generate an e-key (in my opinion, it does not, for the reasons stated above), each of the grounds relying on Zaid (grounds 4-6) still fail because Zaid fails to teach any “request from a user via a user account that has a vehicle associated therewith ... to generate an electronic key” or a “request [that] includes a condition of use of the vehicle as set by the user via the user account,” as required by the claims. EX1001, claims 1, 16, 19.

1. Zaid does not disclose or suggest any “user account” via which a user requests a server to generate an e-key

70. Dr. Almeroth contends that “Zaid discloses or renders obvious a vehicle owner (**user**) that can use a **user account** (such as through [Facebook]) to facilitate a vehicle rental reservation that causes the server to generate an encrypted reservation (**e-key**) to allow an identified user (**identified recipient**) to use the owner’s vehicle.” EX1003, ¶ 204 (emphases in original).

71. Dr. Almeroth alleges Zaid’s “vehicle rental reservation” is alleged to be the claims’ recited “request ... to generate an [] e-key,” and he concludes that this request is made via a “user account” “such as through Facebook,” but Dr. Almeroth fails to identify any disclosure or otherwise show that the alleged server receives a request to generate an e-key via that “user account,” and, in any event, the “Facebook” account described by Zaid is that of the renter, not the vehicle owner, as Dr. Almeroth claims. EX1008, ¶ 72; EX1003, ¶¶ 206-210.

72. Dr. Almeroth contends that “a POSITA would understand that the vehicle reservation request is sent to the server from the owner’s user account. It is the owner who advertises when the vehicle is available for reservation, and it is the owner who has ‘control over the type of user the owner is lending/sharing/renting vehicle to.’” EX1003, ¶ 210 (citing EX1008, ¶¶ 72, 77). Dr. Almeroth further concludes, “a POSITA would therefore understand that the reservation request to the server comes from the owner through the owner’s account.” EX1003, ¶ 210. I disagree with these conclusions for several reasons.

73. First, Zaid instructs that a vehicle owner can advertise their vehicle on social networking sites, such as Facebook, but here Zaid describes a renter of the vehicle—not the vehicle owner—that “must first log into the social networking website before he/she can view the advertisement and make [sic, a] reservation.” EX1008, ¶72. For example, Zaid describes logging into an account, such as Facebook, to view an advertisement and “make [a] reservation.” EX1008, ¶ 72. *Advertising* on social networking sites, such as Facebook, was common at the time of the invention, and a POSITA would understand that social networking sites allowed advertisers to track data of account users who, e.g., “view the advertisement” and click on such an ad, e.g., to “make [a] reservation.” *See* EX1008, ¶72. Therefore, contrary to Dr. Almeroth’s conclusions, a POSITA would understand from these disclosures that a vehicle owner may have an advertisement of their vehicle on others’ Facebook accounts, and may even obtain data to maintain some “control over the type of user the owner is lending/sharing/renting [a] vehicle to,” but when a user clicks on that ad to “make a reservation,” there is no reason to conclude this reservation is *from the owner via the owner’s account*, the alleged “user account.” EX1003, ¶¶ 206-212. Dr. Almeroth draws the conclusion that “because the owner advertises when the vehicle is available for reservation, and the owner has ‘control over the type of user the owner is lending/sharing/renting [a] vehicle to’” “[a] POSITA would understand that the

vehicle reservation request is sent to the server from the owner’s user account.”

EX1003, ¶ 210. But, as shown above, Zaid discloses the opposite.

74. A POSITA would not understand *Zaid* as teaching or suggesting that *an advertiser/owner*—whether or not they obtain tracking data for the account user who clicks on the ad—“must first log into the social networking website before he/she can view the advertisement” of their own vehicle, or require an advertiser/owner to “first log into” their own Facebook account to “make [a] reservation” of their own advertised vehicle. EX1008, ¶ 72.

75. Dr. Almeroth presents an alternative theory that “a POSITA would have found it obvious that the reservation request is sent by the owner through the owner’s account ... [s]ince both the renter and the owner accounts are involved in making the reservation[.]” EX1003, ¶ 211. But the identified disclosures of Zaid do not refer to an “owner account,” and instead describe *a renter* who “must first log into the social networking website before he/she can view the advertisement and make [a] reservation.” EX1008, ¶ 72. I also disagree with Dr. Almeroth’s conclusion that Zaid presents “a mere design choice” of “whether the reservation request is sent by the renter or the owner.” In fact, Zaid never mentions or suggests any *owner account* from which such a reservation request can be made. EX1003, ¶ 211; EX1008.

76. Dr. Almeroth incorrectly states that “Zaid already discloses that the vehicle reservation application can be accessed ‘through one or more social networking websites, such as FourSquare and Facebook,’ where the ‘user must first log into the social networking website.’” EX1003, ¶ 206 (citing EX1008, 72). However, paragraph 72 of Zaid makes no such disclosure. EX1008, ¶ 72. Zaid does not disclose any “vehicle reservation application” that can be accessed through such social networking websites,” but instead describes a user being able to view an advertisement and make a reservation after logging into such social networking websites. *Id.*

77. Dr. Almeroth presents another theory that “[a] POSITA would consider it obvious for an owner to access the rental application through a user account to associate their vehicle with the account.” EX1003, ¶ 206. Again, the relied on “user account” of Zaid refers to the renter’s Facebook account or other social networking website account, not the owner’s. EX1008, ¶ 72. And regardless, Dr. Almeroth identified the “reservation” made via social networking websites, not any “reservation” via a “vehicle rental application” as the alleged “request ... to generate an electronic key” and Zaid’s disclosed *rental application* offers no means by which to “make [any] reservation,” let alone make a request to a server to generate an e-key. EX1008, ¶ 77; EX1001, claims 1, 16, 19. Zaid instructs that its rental application enables updates to be “announce[d]” and “advertise[d],” such

as the location of the vehicle or when it will be available for sharing, but does not offer any disclosure or suggest that this is a user account via which a user can make a request to generate an e-key. *Id.*

2. Dr. Almeroth and the Petition fail to show that Zaid discloses or suggests “the request includes a condition of use of the vehicle as set by the user via the user account.”

78. Claim elements 1[a] / 16[a] / 19[a] each recite that *the same request* to generate an e-key also “includes” a condition of use (“a request ... the request includes...”), *the same user* makes the request and sets the condition of use (“request from a user ... set by the user”), and it is *the same user account* via which the request is made and the condition is set (“via a user account ... as set ... via the user account”). EX1001, claims 1, 16, 19. However, Dr. Almeroth points to different “user accounts,” different “users,” and different “requests,” as alleged disclosures rendering this limitation obvious.

79. For example, as explained above, as a “user account” via which the claimed request is made, Dr. Almeroth points to Zaid’s disclosure of a renter logging into their Facebook account to view an advertisement and “make [a] reservation.” EX1008, ¶ 72. However, for the claims’ recited “condition of use is set by the user *via the user account*,” Dr. Almeroth contends this is set “when the owner ‘announces when the vehicle is available for sharing.’” EX1003, ¶ 210

(citing ¶ 77). Paragraph 77 describes an application in which an owner or renter can advertise or announce updated information, such as a location or when the vehicle is returned, but Zaid does not suggest that this “application” is the Facebook or social networking account that Dr. Almeroth identified as allegedly satisfying “a user account,” and therefore cannot be “*the* user account” via which the user sets a condition of use for the vehicle. EX1008, ¶ 77. Here, Dr. Almeroth points to a reservation made via Facebook advertisements or those on similar social networking sites, but for the same “user account” via which a condition for use is set by the user, Dr. Almeroth points to an unrelated “vehicle rental application” where announcements, updates and other advertisements can be made. Zaid does not suggest that this “application” has the reservation feature pointed to by Dr. Almeroth as the alleged “request ... to generate an [] e-key,” nor does this application suggest any functionality wherein a user can make “a request ... to generate an [] e-key” to a server. EX1008, ¶ 77.

80. Additionally, Dr. Almeroth fails to offer any teaching or suggestion in Zaid that an owner making an “announcement” via a “vehicle reservation application” can enable a user to “set a condition of use for a vehicle” which can be included in a request to generate an e-key. EX1008, ¶ 77.

81. Dr. Almeroth also points to different “users” as involved in making the same request, e.g. *the renter* who *makes a reservation* (alleged to be the

“request [to the server] ... to generate an [] e-key”) and **the “owner** [who] ‘announces when the vehicle is available for sharing’” (alleged to be “the request includes a condition of use as set by the user via the user account”). EX1003, ¶¶ 206, 219. These two different individuals cannot be the same “a user” and “the user” recited by claim elements 1[a] / 16[a] / 19[a]. In any event, Zaid offers no teaching or suggestion that a user can utilize either a social networking website or a vehicle rental application to set a condition for use of the vehicle to both request that a server “generate an [] e-key,” and to “set a condition of use of the vehicle.”

F. The Additional References Do Not Cure the Deficiencies of Zaid.

82. For Grounds 4-6, Dr. Almeroth proposes adding different references in combination with Zaid. However, Dr. Almeroth only proposes doing so as related to other limitations of the independent claims than those limitations discussed above, or as to the dependent claims of the '188 patent. The added references do not cure any deficiencies of Zaid discussed above, and Dr. Almeroth offers no opinion to the contrary.

G. The Additional References Do Not Cure the Deficiencies of Zaid.

83. For grounds 4-6, Dr. Almeroth proposes adding different references in combination with Zaid. However, Dr. Almeroth only proposes doing so as related to different limitations of the independent claims than those discussed above, or as related to dependent claims of the '188 patent. The added references do not cure any

deficiencies of Zaid discussed above, and Dr. Almeroth offers no opinion to the contrary.

IX. CONCLUSION

84. This declaration reflects my opinions as currently held. However, my analysis may continue such that I may consider additional information that may result in additional observations.

85. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further 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.

Executed this 20th day of September, 2024, at Vienna, Austria.


Dr. Sam Malek