

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner

v.

CHARGELOGIC LLC,
Patent Owner

Case IPR2026-00378
U.S. Patent 11,258,107

DECLARATION OF SAMUEL RUSS, PH.D.

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EXHIBIT LIST

Exhibit No.	Description
2001	March 26, 2025 USPTO Memorandum on Interim Processes for PTAB Workload Management, available at https://www.uspto.gov/sites/default/files/documents/InterimProcesses-PTABWorkloadMgmt-20250326.pdf (“Process Memorandum”)
2002	March 11, 2026 Squires Memorandum on Additional Discretionary Institution Considerations – U.S. Manufacturing and Small Business Use of AIA Proceedings, available at https://www.uspto.gov/subscription-center/2026/uspto-issues-additional-discretionary-institution-facts (“Small Business Memorandum”)
2003	Excerpts from File History of U.S. Patent Application 18/298,152 (issuing as U.S. Patent No. 12,272,189)
2004	USPTO Reexaminations – FY 2026, Quarter ending 6/30/2026, available at https://www.uspto.gov/sites/default/files/documents/reexamination-op-stats.pdf
2005	Tesla, Inc. Form 10-K for the Year Ending December 31, 2025
2006	Complaint for Patent Infringement and Jury Demand, <i>ChargeLogic LLC v. Tesla, Inc.</i> , C.A. No. 7:26-cv-00100 (W.D. Tex. March 23, 2026)
2007	Shareholder Deck for Q2 2026 Update, Tesla Investor Relations, July 22, 2026, available at https://assets-ir.tesla.com/tesla-contents/IR/TSLA-Q2-2026-Update.pdf
2008	NHTSA Part 583 American Automobile Labeling Act Report for 2026, available at https://www.nhtsa.gov/part-583-american-automobile-labeling-act-reports

Exhibit No.	Description
2009	CM/ECF Docket Report, <i>ChargeLogic LLC v. Tesla, Inc.</i> , C.A. No. 7:26-cv-00100 (W.D. Tex.) (as of August 23, 2026)
2010	Joint Proposed Scheduling Order, <i>ChargeLogic LLC v. Tesla, Inc.</i> , C.A. No. 7:26-cv-00100, Doc. 34-1 (W.D. Tex. Aug. 10, 2026)
2011	U.S. Patent 10,090,567
2012	Expert Declaration of Samuel Russ, Ph.D.
2013	U.S. Patent No. 8,427,103
2014	U.S. Patent No. 9,950,635
2015	Tesla Home Charging Website, <i>available at</i> https://www.tesla.com/home-charging (last accessed Aug. 26, 2026)
2016	The American Heritage Dictionary (2 nd College Ed. 1982) — “Phone” and “Telephone” definitions
2017	U.S. Patent No. 8,618,771
2018	Microsoft Computer Dictionary (3 rd Ed. 1997) — “PDA” definition
2019	Microsoft Computer Dictionary (5 th Ed. 2002) — “PDA” definition
2020	RESERVED
2021	U.S. Patent No. 8,004,109
2022	Apple, “Apple Reinvents the Phone with iPhone” (Jan. 9, 2007), <i>available at</i> https://www.apple.com/newsroom/2007/01/09Apple-Reinvents-the-Phone-with-iPhone/ (last accessed Sept. 9, 2026)
2023	Apple, “The App Store turns 10” (July 5, 2018), <i>available at</i> https://www.apple.com/newsroom/2018/07/app-store-turns-10/ (last accessed Sept. 9, 2026)

Exhibit No.	Description
2024 to 2028	RESERVED
2029	Tesla, “Elon Musk,” <i>available at</i> https://www.tesla.com/elon-musk (last accessed Sept. 15, 2026)

I. INTRODUCTION

1. I have been retained as a technical expert by ChargeLogic LLC (“ChargeLogic” or “Patent Owner”) and asked to provide my objective and unbiased opinions concerning the patentability of U.S. Patent No. 11,258,107 (“the ’107 Patent”). Specifically, I have been asked to provide my opinions on the patentability of the challenged claims of the ’107 Patent in view of the grounds advanced in the pending Petition for *Inter Partes* Review filed by Tesla, Inc. (“Tesla” or “Petitioner”) against the ’107 Patent (IPR2026-00378), the state of the art at the time of the claimed inventions, and the knowledge of a person of ordinary skill in the art at the time of the claimed inventions.

II. BACKGROUND AND QUALIFICATIONS

2. My Curriculum Vitae is attached hereto as Appendix A.
3. In forming the opinions expressed in this Declaration, I have considered and relied upon my education, background, and experience. In addition, I have reviewed and relied upon materials in preparing this Declaration, as described herein.
4. I received a Bachelor’s degree in Electrical Engineering from the Georgia Institute of Technology (“Georgia Tech”) in 1986 and a Ph.D. in Electrical Engineering from Georgia Tech in 1991.

5. From 2007 to the present, I have been a member of the faculty of the University of South Alabama as an Assistant and Associate Professor in the Department of Electrical and Computer Engineering. During that time, I have won awards for excellent teaching.

6. I am active in the Institute of Electrical and Electronic Engineers (“IEEE”) and am a Distinguished Lecturer for the IEEE Consumer Electronics Society. As a consultant, I have conducted briefings for members of the financial community on technology trends in the cable, satellite, and Internet Protocol Television (“IPTV”) sectors.

7. I also served on the faculty of Mississippi State University from 1994 to 1999 as an Assistant Professor in the Department of Electrical & Computer Engineering, where I taught circuit board design and two-way interactive video classes, among other things.

8. I have also authored at least 15 journal articles and at least 31 conference papers.

9. With regard to batteries and battery charging, the subject matter associated with the ’107 Patent, I have actively developed numerous systems that used batteries and battery chargers.

10. From 1999 to 2000, I developed a portable version of a payment terminal. To complete the design based on Nickel Metal Hydride (“NiMH”)

batteries, I had to consider thermal issues, charge management, and charge memory associated with incomplete discharging.

11. From 2016 to 2022, I managed the design of a fully functional satellite that was successfully deployed in orbit in 2022. The satellite included a maximum power-point tracking solar battery charger and Lithium-Ion batteries. The batteries required a special safety rating for safe storage on the International Space Station, and I architected the software specifically for very low power consumption. I overhauled the EE 457 Embedded Systems course to include components of safety and ethics, and I use batteries and battery chargers as examples of systems with significant safety risks. I also teach specifically on battery charging and battery chemistry so that students can be prepared for battery-equipped systems.

12. I have no financial interest in ChargeLogic or the '107 Patent. I am being compensated for my time spent in connection with these proceedings at an hourly rate. I am also being reimbursed for reasonable expenses, such as travel expenses. My compensation is not contingent on my opinions, on the outcome of any matter, or on any of the technical positions I explain in this declaration.

III. LEGAL STANDARDS

13. I am not an attorney. For purposes of this Declaration, I have been informed about certain aspects of the law that are relevant to my opinions, as set forth below.

A. Patentability

14. I understand that for an invention claimed in a patent to be valid and patentable, it must be, among other things, new and not obvious in light of what was known and came before it. That which was known or came before the claimed invention is generally referred to as “prior art.”

15. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can be shown to “anticipate” the claim. Second, the prior art can show that the claim was obvious to a person of ordinary skill in the field of the invention at the time the invention was made.

16. I understand that, for a patent claim to be “anticipated” by the prior art, each and every element or requirement of the claim must be found, expressly or inherently, in a single prior art reference. Further, I understand that anticipation requires that the single prior art reference must disclose the elements of the claim arranged or combined in the same way as in the claim. It is my understanding that whether a claimed invention is obvious is a question of law, with underlying factual inquiries that are determined from the perspective of a person of ordinary skill in the art at the time of the claimed invention.

17. It is my understanding that a claimed invention is obvious if the differences between the claimed invention and the prior art are such that the claimed

invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art (a “POSITA”).

18. It is my understanding that obviousness requires consideration of the following underlying factual inquiries:

- determining the scope and content of the prior art;
- ascertaining the differences between the claimed invention and the prior art;
- resolving the level of ordinary skill in the art; and
- evaluating objective evidence or “secondary considerations” of non-obviousness, such as experimental results, commercial success, long-felt but unresolved needs, failure of others, industry praise, and unexpected results.

19. It is my understanding that a reference must be analogous art to the claimed invention in order to be properly considered for use in an obviousness inquiry. It is my understanding that a reference is analogous art to the claimed invention if:

- The reference is from the same field of endeavor as the claimed invention (even if it addresses a different problem); or
- The reference is reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed invention).

20. It is my understanding that whether a reference is reasonably pertinent depends on how the problem faced by the inventor is reflected, either explicitly or implicitly, in the specification.

21. It is my understanding that the following are exemplary rationales that may support a conclusion of obviousness:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of known techniques to improve a similar method or product in the same way;
- Applying a known technique to a known method or product ready for improvement to yield predictable results;
- Obvious to try – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; and
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

22. In addition to the above, I understand that a person of ordinary skill in the art may resort to logic, judgment and common sense available to him or her at the time of the invention or prior to the invention to find a claim feature obvious, even if the prior art relied on does not explicitly state or teach that feature. I understand that when common sense is relied on to find a feature obvious, the reasoning for that conclusion must be articulated with sufficient clarity.

23. I also understand that a patent claim is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. An obviousness determination requires finding both that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so. I understand that it is important to be careful not to allow hindsight reconstruction of references to produce the claimed invention, without any explanation as to how or why the references would be combined to produce the claimed invention.

24. Regarding “objective evidence” or “secondary considerations,” I understand that for such evidence to be relevant to the obviousness of a claim, there must be a causal relationship (called a “nexus”) between the claim and the evidence. I also understand that such objective evidence may include: commercial success of products covered by the patent claims; long-felt need for the invention; failed

attempts by others to solve the problem addressed by the invention; copying of the invention by others in the field; unexpected results achieved by the invention; praise of the invention; the taking of licenses under the patent by others; expressions of surprise by experts and those skilled in the art at the making or use of the invention; and that the patentee proceeded contrary to the accepted wisdom of the prior art.

25. I understand that a person of ordinary skill is also a person of ordinary creativity. I further understand that the obviousness analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, but instead can take into account “ordinary innovation” that does no more than yield predictable results, which are inferences and creative steps that a person of ordinary skill in the art would be understood to employ.

26. I understand that sometimes it will be necessary to look to interrelated teachings of multiple patents and publications; the effects of demands known to the relevant field or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art. I understand that all these issues may be considered to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

B. Prior Art

27. I understand that for purposes of this proceeding, prior art includes patents and printed publications (e.g., journal articles) in or outside the United States

before the effective filing date of the claimed invention. I also understand that prior art includes U.S. patents, published U.S. patent applications, and published international applications (pursuant to the Patent Cooperation Treaty) that themselves have an effective filing date before the effective filing date of the claimed invention, as long as they name another inventor.

C. Inherency

28. I understand that if a prior art reference does not expressly set forth a particular claim element, the prior art may still disclose that element if it is “inherent” in its disclosure. To establish inherency, it is my understanding that evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference. It is my understanding that inherency may not be established by probabilities or possibilities. In other words, it is my understanding that the mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency.

29. I understand that under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform a claimed method, then the method will be considered to be anticipated by the prior art device. I also understand that when the prior art device is the same as a device described in the specification for carrying out the claimed method, it can be assumed that the device will inherently perform the claimed process.

D. Person of Ordinary Skill In The Art

30. I understand that “a person of ordinary skill in the art” or POSITA is a hypothetical person who is presumed to have known the relevant art at the time of the invention. Such a person would necessarily have the capability of understanding any scientific and engineering principles applicable to the pertinent art.

31. I understand that factors that may be considered in determining the level of ordinary skill in the art include, but are not limited to, the following:

- a. the educational level of the inventor;
- b. the type of problems encountered in the art;
- c. prior art solutions to those problems;
- d. the rapidity with which innovations are made;
- e. the sophistication of the technology; and
- f. the educational level of active workers in the field.

32. I understand that a person of ordinary skill in the art is not a real person, but rather is a hypothetical individual having the qualities reflected by the factors above. This hypothetical person has knowledge of all prior art in the relevant field as if it were arranged on a workshop wall and takes from each reference what it would teach to a person of ordinary skill in the art.

33. I understand that a person of ordinary skill in the art is a person of ordinary creativity, not an automaton. In many cases a person of ordinary skill will be able to fit the teachings of multiple prior art references together like pieces of a puzzle.

34. I understand that a person of ordinary skill in the art can collaborate with one or more other persons of ordinary skill in the art for one or more aspects with which the other person may have superior expertise, experience, and/or knowledge.

E. Claim Construction

35. It is my understanding that claim construction, or the interpretation of the claims of a patent, is ultimately a question of law. I have been informed that claim terms are generally presumed to carry their ordinary and customary meaning. However, I understand that a patent applicant is his own lexicographer and is entitled to provide alternate definitions of words in common usage, but if the patent applicant uses a term that is in common usage without providing an alternate definition, then that term should generally be understood as having its common meaning.

36. I understand that a person of ordinary skill in the art is deemed to read a claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent specification and the “file history” of the patent developed during examination by the Patent Office.

37. I understand that the claims, the specification, and the file history are referred to as “intrinsic evidence,” and are to be read as a person of ordinary skill in the art at the time of the invention would have done at the time of the alleged invention.

38. In addition to the intrinsic evidence, I understand that the court or tribunal may also consider other relevant evidence, which is called “extrinsic evidence,” concerning relevant scientific principles, the meaning of technical terms, and the state of the art. Such evidence includes the testimony of qualified expert witnesses. Although extrinsic evidence may be used to resolve ambiguities that may exist after reviewing the intrinsic evidence, I understand that extrinsic evidence cannot be used to contradict a claim construction that is clear from the intrinsic evidence.

39. I understand that some claims are independent, and that those independent claims are complete by themselves. Other claims refer to these independent claims, or other dependent claims, and are “dependent” on those claims. The dependent claims include all of the limitations of the claims on which they depend.

IV. BASES FOR OPINIONS

40. The opinions set forth in this Declaration are my own. In forming the opinions herein, I have considered the Petition for *Inter Partes Review* filed in the

IPR proceedings referenced above and exhibits thereto, as well as the additional materials cited in this Declaration (including the exhibits to the Patent Owner's Response cited herein), and my education, training, and experience.

41. My analysis of the materials relating to this matter is ongoing and I will continue to review any new material that is provided to me. This Declaration represents certain opinions that I have formed to date and the bases for those opinions. I reserve the right to revise, supplement, and/or amend my opinions based on new information presented to me and on my continuing analysis of the materials cited herein or later provided to me.

V. LEVEL OF ORDINARY SKILL IN THE ART

42. I understand that Petitioner's expert, Mr. Andrews, provides the following opinion on the level of a POSITA:

[A] POSITA at the time of the '107 Patent would have had at least a bachelor's degree in electrical or mechanical engineering (or an equivalent field) and at least two years of work experience involving automotive systems, including electric vehicle battery charging systems. Additional industry experience or technical training may offset less formal education, while advanced degrees or additional formal education may offset lesser levels of industry experience.

Ex. 1003 ¶ 29.

43. For purposes of this Declaration only, I have applied the definition of a person having ordinary skill in the art ("POSITA") proposed by Petitioner but with

the one modification. Specifically, the proposed definition should not require “automotive systems” experience generally, which would include experience with transmissions, cooling systems, and other systems unrelated to batteries or battery charging. Instead, the industry experience should simply require at most two years of experience with electric battery chargers, which can be offset by higher levels of relevant education. Although the ’107 Patent focuses on electric vehicle battery chargers, a POSITA would not require specific experience with such chargers if they have sufficient experience with other types of chargers. For example, I have considerable experience with battery chargers for satellite systems and for portable payment terminals, which are not meaningfully different in terms of technical complexity or complexity of operation as compared to vehicle chargers.

44. My education and experience exceed that of a POSITA as described above and qualify me to testify as to the knowledge of a POSITA under any reasonable definition. *Supra* Section II (“Background and Qualifications”). Moreover, even under Petitioner’s proposed level of ordinary skill in the art, I qualify based on my significantly higher level of education, which offsets the requirement of any specific industry experience.

45. All references to a POSITA here are made pursuant to this modified definition. However, my application of that definition is not a reflection of my

agreement or disagreement with it. I reserve the right to provide my own opinion on the level of ordinary skill should there be further proceedings.

46. With these understandings, my testimony herein relates to the knowledge and understanding of a POSITA as of August 18, 2008. I understand this is the priority date applied by Petitioner, and I have been asked to use this date for the purposes of my testimony. I have formed no opinion on whether this date is the appropriate date, nor have I been asked to do so.

VI. CLAIM CONSTRUCTION

47. I understand that the Petition applies the “ordinary and customary meaning of the claim terms” to all terms but one: “threshold level of charge,” which appears in all three independent claims. *See* Pet., 2 (“For all terms not included below, Petitioner applies the ordinary and customary meaning of the claim terms.”), 3 (“Otherwise, Petitioner applies the plain and ordinary meaning of all claim terms”). Specifically, the Petition proposes that this phrase be construed to mean “a level of charge that is less than the charge level at which charging stops.” *Id.* at 2–3. The entirety of Petitioner’s discussion of that construction is as follows:

Petitioner proposes the phrase “threshold level of charge” be construed as “a level of charge that is less than the charge level at which charging stops.” *See* Claims 1, 6, 10. *See e.g.*, EX1001, 2:45-50, 20:14-63 (“the controller 44 can continue to charge the vehicle battery 20, and can do so without interruption following battery charging to the minimum

threshold level of battery charge”). Otherwise, Petitioner applies the plain and ordinary meaning of all claim terms.

Id.

48. It is my understanding that, generally speaking, the plain and ordinary meaning of a claim term applies unless the patentee explicitly redefines the term or disavows its full scope. The Petition does not identify any disavowal or disclaimer that would lead a POSITA to interpret “threshold level of charge” any differently than its plain and ordinary meaning. Although the Petition cites to two passages from the Specification of the ’107 Patent—EX1001, 2:45-50, 20:14-63—those passages are describing embodiments rather than the invention as a whole, and nothing in them would be understood to be a disclaimer or disavowal of claim scope.

49. Moreover, neither passage supports the Petition’s express construction. Specifically, column 2, lines 45 to 50 simply states “wherein the controller supplies electric power to the battery if a level of battery charge is below a threshold level of battery charge independent of the time of day entered by the user, the controller supplying electric power to the battery ***until the threshold level of battery charge is reached.***”¹ It is unclear how the Petitioner believes that this supports a construction of “level of charge that is less than the charge level at which charging stops.”

¹ All ***italic-bold*** emphasis and alterations have been added unless otherwise indicated.

Similarly, column 20, lines 14 to 63 describes “charging the battery 20 *until a minimum 20 threshold level of battery charge has been reached* regardless of whether a programmed charge has also been selected as described above.” It is again unclear how this supports Petitioner’s express construction. As such, it is my opinion that there is no evidence in the intrinsic or extrinsic record that supports the Petitioner’s express construction. Moreover, there is no reason, such as some ambiguity or potential for confusion, arising from the specification that motivates a need for a construction as opposed to merely applying the claim term’s plain and ordinary meaning to a POSITA.

50. It is also my opinion that Petitioner’s express construction is ambiguous given the lack of any accompanying explanation. For example, the Petition defines the threshold by reference to “the charge level at which charging *stops*,” even though the Claim 1[e][iii] and [iv] require that “the predetermined threshold level of charge be[] *less than a full charge* of the battery” and that the alert be sent “*before* the charging of the battery is *complete*.” Ex. 1001, 47:10-25. The Petition does not explain what its express construction adds, excludes, or changes, and it would require some degree of speculation to understand what precisely Petitioner is trying to convey. In other words, the proposed construction creates ambiguity rather than eliminates it. I understand that an express construction is only required in *inter partes* review if it is necessary to resolve the parties’ validity dispute, but in this case it is

unclear why Petitioner contends its express construction is necessary or how it impacts validity at all. This is the case despite the Petition making clear that it is applying this express construction for purposes of applying the prior art. *See* Pet., 12 (“As explained above, a ‘*threshold level of charge*’ means ‘a level of charge that is less than the charge level at which charging stops.’ *See* Section III.C.”).

51. It is also worth noting that Petitioner’s expert, Mr. Andrews, does not support the express construction. He states only: “I have been instructed by counsel to apply the claim construction for ‘*threshold level of charge*’ as ‘a level of charge that is less than the charge level at which charging stops.’” Ex. 1003 ¶ 28. He offers no opinion that the construction is correct or that a POSITA would have understood the phrase that way—something that is highly unusual in my experience. If Mr. Andrews agreed with Petitioner’s express construction, I would expect him to opine on it in his declaration, just as he opines on many other validity issues.

52. I also note that Petitioner takes inconsistent claim construction positions across related IPR proceedings without explanation. Petitioner is concurrently challenging related U.S. Patent Nos. 10,090,567 and 11,721,844 in IPR2026-00377 and IPR2026-00380, respectively. I note that I am also preparing declarations in those IPRs and am well aware of them. Those patents share a common specification with the ’107 Patent, and I am offering opinions in, and therefore have read the petitions for, these matters. Petitioner proposed the same

construction for “threshold level of charge” in the ’844 IPR petition, but proposed “plain and ordinary meaning” for “threshold level of battery charge” in the ’567 IPR petition. *See Tesla, Inc. v. ChargeLogic LLC*, IPR2026-00380, Paper 1 at 2-3; *Tesla, Inc. v. ChargeLogic LLC*, IPR2026-00377, Paper 1 at 3, 59-60. Although the latter phrase has the word “battery,” a POSITA would understand that there is no logical basis for construing it differently in patents that are directed to a *battery* charger. The inconsistency in claim construction positions is not academic: if plain and ordinary meaning suffices in the ’567 proceeding, the Petition does not explain why a departure from that meaning is necessary here—and if the departure is necessary here, Petitioner’s ’567 mapping is unexplained.

VII. OPINIONS ON GROUND 1

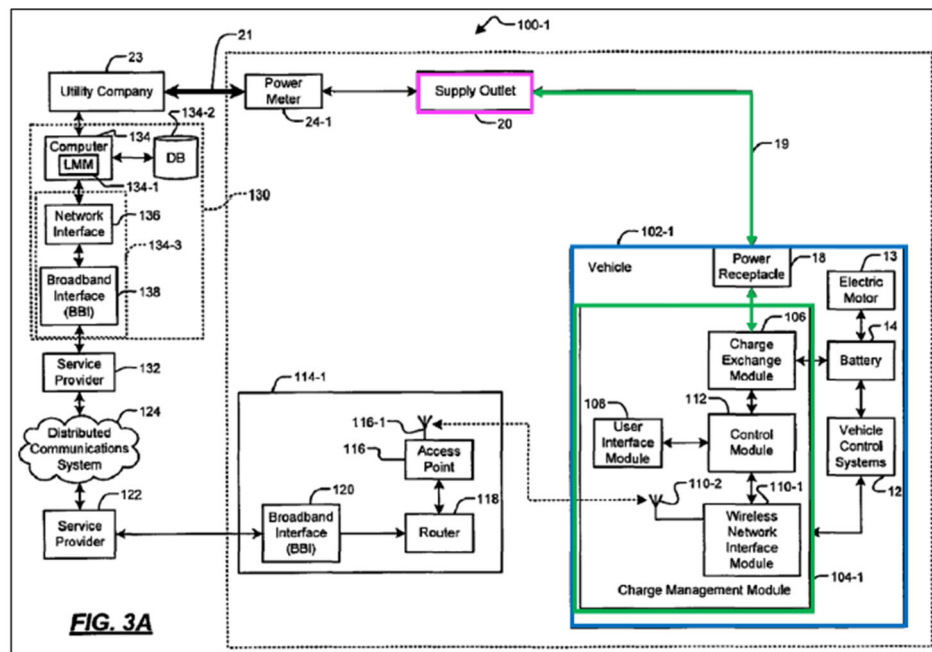
53. The Petition asserts that the combination of Sutardja, Hobbs, Kelty-078, and Anttila renders obvious claims 1-5 of the ’107 Patent. Pet., 2. For the reasons set forth below, it is my opinion that this combination would not have rendered any of these claims obvious to a POSITA.

A. Independent Claim 1

1. Claim 1[a]-[b]: “[a] a battery charger having: [b] an electrical power cord releasably attachable to at least one of the vehicle and a source of power”²

54. I have reviewed the Petition’s contentions regarding this limitation. The Petition contends that this limitation is taught by Sutardja-Hobbs-Kelty-078-Anttila (Ground 1). Specifically, the Petition states:

Sutardja teaches a *battery charger (i.e., CMM 104-1 with connector/cable 19)* comprising an *electrical power cord (cable/connector 19)* releasably attachable to at least one of the *vehicle (vehicle 102)* and a *source of power (supply outlet 20)*....



² I use the same claim element reference letters set forth in the Petition.

Pet., 7 (footnote omitted). Under this mapping, the Petition equates the claimed “battery charger” with (i.e.) the combination of **CMM 104-1** and **connector/cable 19**.

55. In my opinion, this mapping is unfounded and illogical. Specifically, the Petition identifies the claimed “battery charger” as the combination of CMM 104-1 and connector/cable 19; however, those two components are totally separated by a third component—power receptacle 18—that the Petition does not identify as forming any part of the “battery charger.” A POSITA would find it difficult to understand how connector/cable 19 and CMM 104-1 can be considered part of the claimed “battery charger” when both components are totally separated from one another by another component that the Petition excludes from the “battery charger.” Mr. Andrews also does not explain this theory; he simply repeats the same mapping nearly *verbatim*. Compare Pet. at 7-8 with Ex. 1003 ¶¶ 97-98. Consequently, a POSITA would find Petitioner’s mapping to be implausible.³

³ The issue here is not whether the combination of the CMM 104-1, receptacle 18 and connector/cable 19 can be considered a “battery charger”—on which I have not been asked to provide an opinion. Instead, the issue is whether the CMM-104-1 and connector/cable 19 can be considered the claimed “battery charger” *without* the receptacle 18 being part of the alleged charger as specifically proposed by Petitioner.

CMM 104-1 is identified as the “battery charger”—not the cable/connector 19:



10 (“Sutardja teaches *a battery charger* (CMM 104-1) Sutardja’s **controller**
(**modules 112/106**) (1) is housed within **battery charger (CMM 104-1)**....”).

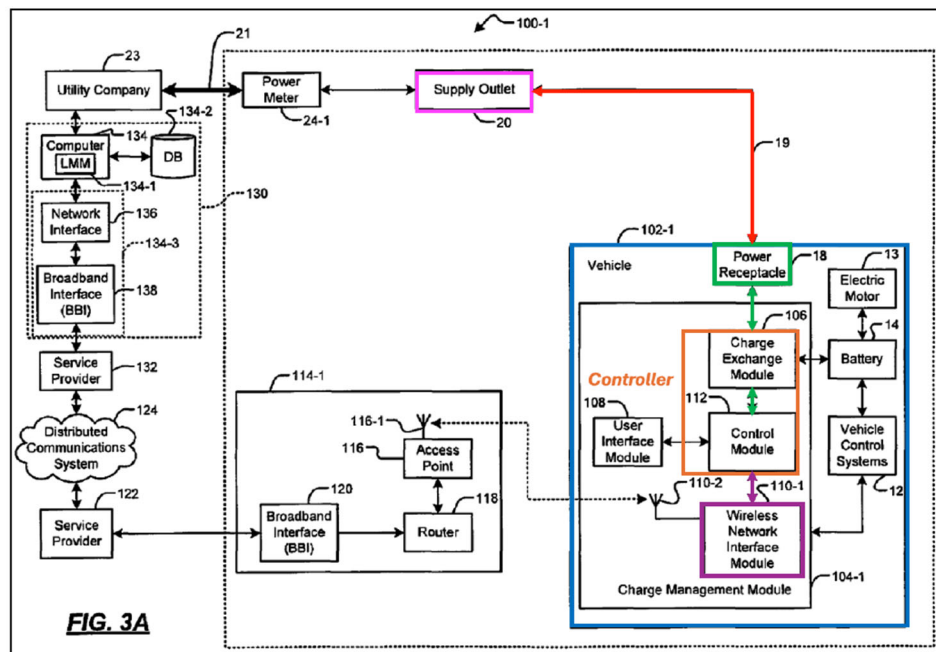
component that *the Petition does not consider* to be part of the “battery charger,” it is my opinion that Ground 1 is not supported as to this limitation.

2. Claim 1[d]: “a controller electrically coupled to the electrical power cord and to the transmitter”

58. For this limitation, the Petition contends:

Sutardja teaches *a battery charger (CMM 104-1) having a controller comprising one or more processors, namely the collective controller control module 112 and charge exchange module 106 (“modules 112/106”), electrically coupled to the electrical power cord (cable/connector 19) and to the transmitter.*

Fig. 3A depicts Sutardja’s **controller (modules 112/106)** electrically coupled to **cable/connector 19** and **WNIM 110-1** (which includes a transmitter, *see* Claim 1[c]) via **intervening charging circuitry**:

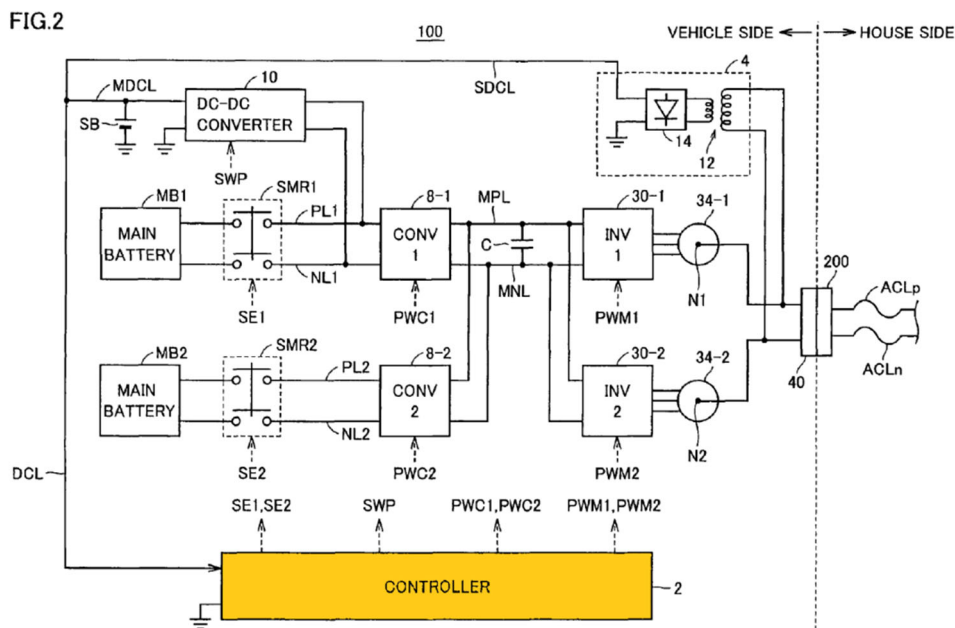


Pet., 10-11.

59. Sutardja explicitly refers to element 112 as the “**control** module,” but the Petition maps the “controller” to both “control module” 112 and “charge

exchange module” 106. However, neither the Petition nor Mr. Andrews explains why a POSITA would understand the claimed “controller” to extend beyond “control module” 112. They simply assert that it does without any elaboration.

60. The prior art illustrates why this unexplained mapping is problematic. For example, U.S. Patent No. 8,618,771 (assigned to Toyota) depicts its “controller 2” (orange) as a single contiguous device:



Ex. 2017.

61. Similarly, U.S. Patent No. 8,004,109 (also assigned to Toyota) depicts its “control device” 30 (orange) as a single contiguous device:

The diagram illustrates a power system for a vehicle, labeled as Figure 1. It shows the following components and connections:

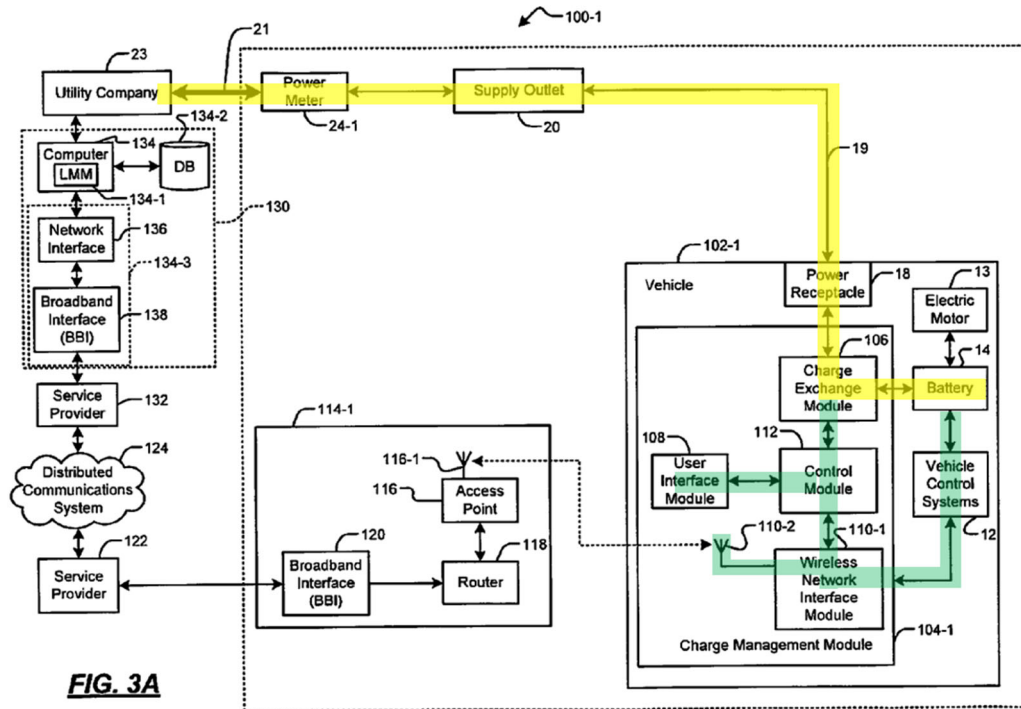
- Power Sources:**
 - 39A SMR1, 39B SMR2, and 39C SMR3 (Switching Mode Rectifiers).
 - CONVERTER FOR CHARGING BATTERY connected to an AC100V source.
 - ENGINE connected to the POWER SPLIT MECHANISM.
- Power Conversion and Distribution:**
 - BOOST CONVERTER (12A) and BOOST CONVERTER (12B) receive input from the SMRs and the charging battery converter.
 - INVERTER (14) and INVERTER (22) receive input from the boost converters and output to the POWER SPLIT MECHANISM.
 - POWER SPLIT MECHANISM is connected to the WHEEL (2).
- Control and Monitoring:**
 - CONTROL DEVICE (30) is connected to the BOOST CONVERTERS and INVERTERS.
 - WHEEL (2) is connected to the POWER SPLIT MECHANISM.
 - Various sensors and switches (e.g., 10A, 10B1, 10B2, 10C1, 10C2, 10C3, 10C4, 10C5, 10C6, 10C7, 10C8, 10C9, 10C10, 10C11, 10C12, 10C13, 10C14, 10C15, 10C16, 10C17, 10C18, 10C19, 10C20, 10C21, 10C22, 10C23, 10C24, 10C25, 10C26, 10C27, 10C28, 10C29, 10C30, 10C31, 10C32, 10C33, 10C34, 10C35, 10C36, 10C37, 10C38, 10C39, 10C40, 10C41, 10C42, 10C43, 10C44, 10C45, 10C46, 10C47, 10C48, 10C49, 10C50, 10C51, 10C52, 10C53, 10C54, 10C55, 10C56, 10C57, 10C58, 10C59, 10C60, 10C61, 10C62, 10C63, 10C64, 10C65, 10C66, 10C67, 10C68, 10C69, 10C70, 10C71, 10C72, 10C73, 10C74, 10C75, 10C76, 10C77, 10C78, 10C79, 10C80, 10C81, 10C82, 10C83, 10C84, 10C85, 10C86, 10C87, 10C88, 10C89, 10C90, 10C91, 10C92, 10C93, 10C94, 10C95, 10C96, 10C97, 10C98, 10C99, 10C100) are used for monitoring and control.

62. Whether the Petition adequately explains why the “charge exchange module” 106 makes up part of the claimed “controller” matters, because the language of element 1[d] requires that the “controller” be “electrically coupled to the electrical power cord” and later element 1[e][iii] requires that the claimed

controller be configured to “compare ... a level of charge of the battery to the predetermined threshold level of charge.”

63. With respect to the requirement of 1[d], a POSITA would understand that control module 112 is *electrically isolated* from the power by charge exchange module 106, which is the component that electrically interacts with the cable and power supply. Indeed, my experience is that modules such as the charge exchange module 106 serve this very purpose in order to protect the relatively sensitive control logic. Thus, control module 112 is neither directly nor indirectly “electrically” coupled to the cable/connector 19.

64. A POSITA would understand that when two components are “electrically coupled” they must at least be able to interact electrically with one another. As shown below, “charge exchange module” 106 is “electrically coupled” to the “cable and connector” 19 because it “exchange[s] charge between the battery 14 and the power receptacle 18” (Ex. 1004 ¶ [0242]) via the yellow path. Thus, the electrical interaction is the exchange of power between them.



65. In contrast, nothing in Sutardja teaches or suggests that “control module” 112 is capable of electrical interaction with the “cable and connector” 19. To the contrary, Sutardja teaches that the control module 112 “may communicate with the charge exchange module 106, the user interface module 108, and the wireless network interface module 110-1 and may control the operation of the CMM 104-1.” Ex. 1004 ¶ [0243]. While “control module” 112 electrically interacts with those components, it cannot electrically interact with the “power receptacle” 18 or the “cable and connector” 19 because (1) the *only* thing sent or received over those components is power, and (2) the “charge exchange module” 106 *exclusively* handles the exchange of that power. Ex. 1004 ¶ [0242] (“[T]he charge exchange module 106 charges the battery 14 using the power received from the utility

company 23 via the supply outlet 20 and may return charge from the battery 14 to the utility company 23 via the supply outlet 20.”). Consequently, a POSITA would understand that although the control module 112 is “electrically coupled” to charge exchange module 106 as indicated in green (i.e., those two components exchange electrical signals with one another), control module 112 is not “electrically coupled” to receptacle 18 (or the “cable and connector” 19), because control module 112 and receptacle 18 are electrically isolated from one another by the charge exchange module 106. A POSITA would understand that this isolation is important because it protects control module 112 from potentially damaging currents and voltages.

66. The Petition further argues that the specification “explains the terms ‘mounted,’ ‘connected,’ ‘supported,’ ‘coupled,’ and variations thereof, are used broadly and encompass both direct and indirect connections.” Pet., 10. But the claim does not recite a *physical* coupling. The claim requires an *electrical* coupling, which requires that the two components be able to interact *electrically*, whether directly or indirectly. Thus, even under the broadest reading of “coupled,” the coupling must still be *electrical*, and an indirect connection through an intervening component that blocks any electrical interaction is not one. As explained above, the charge exchange module 106 acts as a barrier to any electrical interaction between the control module 112 and power receptacle 18—the control module 112 electrically interacts with the charge exchange module 106 (by exchanging *data signals*) and the charge exchange

module 106 electrically interacts with receptacle 18 (by exchanging *power*). There is thus no direct or indirect electrical interaction between the control module 112 and the receptacle. Nor could there be, because the receptacle 18 deals in *power*, not *data signals*.

67. As to the “comparison” requirement of 1[e][iii], it is the charge exchange module 106—**not** control module 112—that the Petition identifies as performing the claimed comparison. Pet., 17 (identifying “charge monitoring module 150” of the charge exchange module 106 as performing the claimed function). Thus, by the Petition’s own mapping, control module 112 alone cannot satisfy the requirements of the claimed “controller.” Thus, if it is determined that the Petitioner has not adequately explained why the claimed “controller” would extend beyond the “control module” 112 and also encompass the “charge exchange module” 106, it would present a significant problem for the obviousness theory.⁴

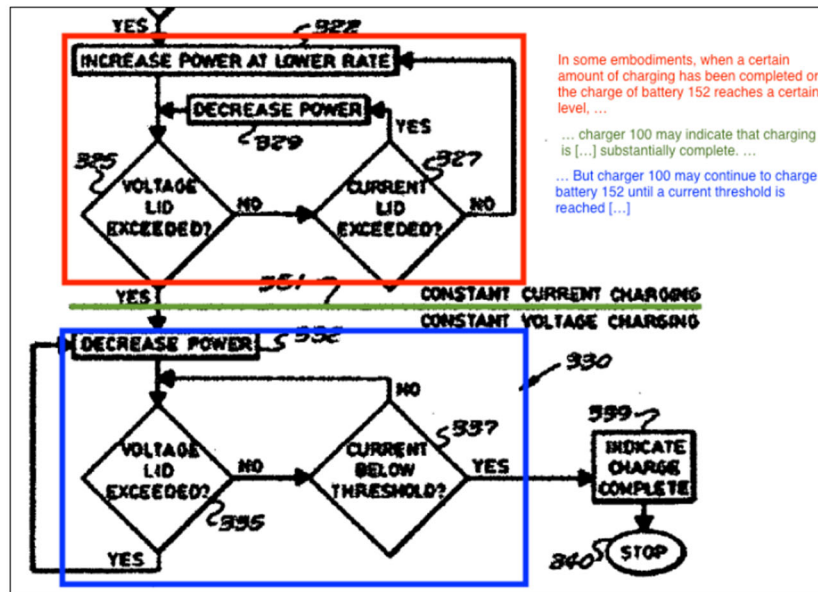
⁴ I understand that the sole issue here is whether Petitioner has adequately *explained why* the components identified in Sutardja constitute the claimed “controller.” I have not been asked to provide my opinion on whether those components would collectively qualify as the “controller,” because it is my understanding that it is the Petitioner’s burden to first explain how they do. As such, neither I nor ChargeLogic take a position on the issue of whether the identified components would collectively qualify as the claimed “controller” under the appropriate construction of that term.

3. Claim 1[e][i-ii]: “the [battery charger] controller configured to ... [i] receive, via a user-manipulatable control, data indicative of a predetermined threshold level of charge [ii] by which the controller sends an alert, the predetermined threshold level of charge being less than a full charge of the battery,”

68. I have reviewed the Petition’s obviousness theory for this limitation. The Petition relies on Sutardja for the **user-input** portion of the limitation, contending that Sutardja’s user inputs “charging parameters” including “charge levels of the batteries” may be expressed as a percentage. Pet., 12-13.

69. The Petition then relies on Hobbs for the *alert before charging stops*. Specifically, the Petition asserts that Hobbs discloses “a second charge threshold, less than a full charge, *at which the controller sends an alert*” (i.e., what the Petition labels Hobbs’s “notification threshold”) because Hobbs’s charger 100 “may indicate that charging is ... substantially complete” when “the charge of battery 152 reaches a certain level,” yet “continue[s] to charge battery 152 until a current threshold is reached.” Pet. at 14-16 (emphasis removed).

70. As demonstrated below by the Petition’s annotated version of Hobbs’ Figure 3, the Petition proposes amending Sutardja to add in Hobbs’ complex current threshold system for the purpose of reaching the user-defined “predetermined threshold” limitation:



Pet. at 15. According to the Petition, “a POSITA would have appreciated once the user inputs Sutardja’s desired charge amount (predetermined levels of charge), Hobbs would look up the *associated current threshold in Hobbs’s look-up table* to Sutardja’s charge amount.” Pet., 19.

a. Technical Analysis of the Obviousness Rationales.

71. In my opinion, a POSITA would not have found it obvious to combine Sutardja and Hobbs for several reasons.

72. First, in my opinion, there would have been no reason to combine Sutardja and Hobbs as proposed. Sutardja is specific to a residential or work vehicle battery charger system that can schedule charging times on the basis of energy costs. Ex. 1004, 1 (titled “PLUG-IN *VEHICLE*”); *id.* (Abstract stating the “control module stores a first set of charging parameters for charging a battery *in a vehicle*”); *id.* ¶

[0229] (“Many people arrive *home after work* at about the same time such as between 5 pm and 7 pm. If a significant number of these people plug in their vehicles for recharging batteries at the same time, the demand for power may exceed the available supply.”); *id.* ¶ [0239] (“A vehicle 102-1 is charged at a location such as a *home or work location*.”).

73. In contrast, Hobbs is directed toward a public, pay-per-use, *universal battery charger*. Ex. 1006 ¶ [0009] (“One object of the present invention is to provide a charger that can automatically *identify the type of battery*....”); *id.* ¶ [0026] (“Chargers in accordance with the present invention may automatically charge at the correct battery voltage for *various types of batteries*.”); *id.* ¶ [0030] (“[C]hargers in accordance with the present invention may be used for *stationary battery charging* in energy storage (such as load shifting, or brown out/blackout ride through or other ‘non-floating’ charge applications), *portable electric energy equipment*, and *distributed or renewable electrical energy battery applications* such as, solar, wind, tidal or wave, and geothermal primary energy sources.”); *id.* ¶ [0033] (“Charger 100 may deliver electricity for *many different battery chemistries or classifications in many different types of arrangements or groups of individual battery cells*....”); *id.* ¶ [0036] (“[A] user may activate or enable charger 100 *by swiping a card* through card reader 110, which may be a credit card....”).

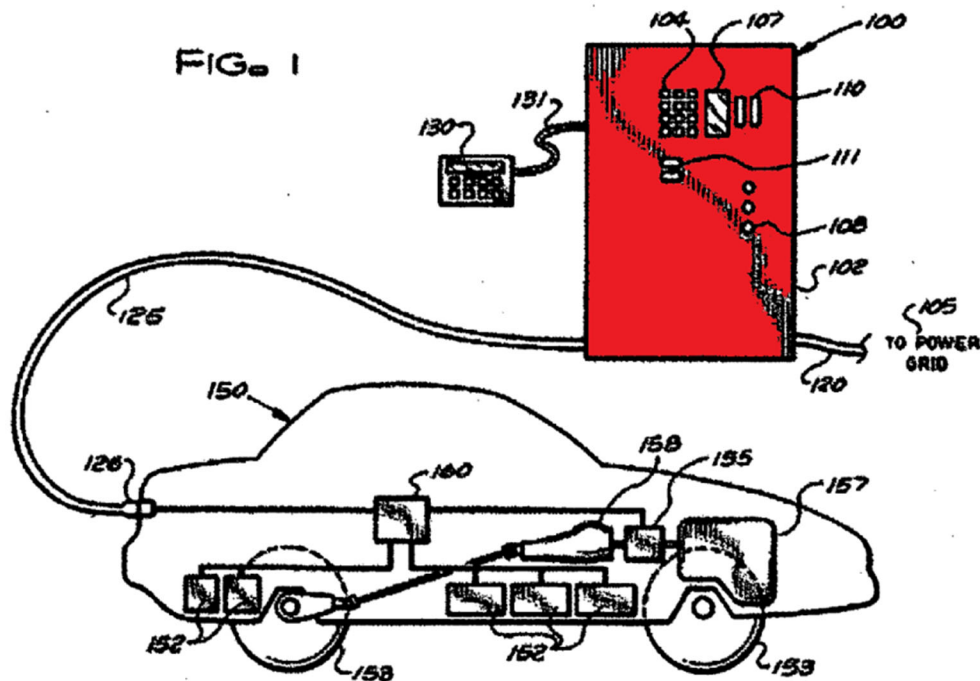
74. A POSITA would recognize that the sole reason Hobbs teaches its complex “current threshold” and “look-up table” based system is because its charger is for universal charging—i.e., where the battery being charged can be of many disparate types. There is no logical reason a POSITA would have included any of the complex “current threshold” features of Hobbs’s *universal charger* into Sutardja’s *vehicle-specific* charger. Hobbs requires table 272 because the bulky charger 100 is a public, universal battery charger and must not only identify an unknown battery, including batteries of varying chemistry, before charging but it must be able to charge many different battery types and sizes as well. *See* Ex. 1006 ¶ [0052] (“Look-up table 272 may be used to store information on various types of batteries that may be charged by charger 100. Look-up table 272 may be part of a *battery classifier or system configured to identify the type of battery* pack or battery (e.g., 152) being charged....”). This identification is vitally important. As I teach in my Embedded Systems course, different battery chemistries have very different charging profiles, and using a charger for one chemistry to charge a battery with a different chemistry is quite dangerous. In other words, this is why a charger like that in Hobbs needs chemistry identification and a look-up table. Sutardja’s CMM 104-1, by contrast, is an in-vehicle charger specifically designed for a vehicle battery 14. Even overlooking the fact that nearly all vehicle batteries are Lithium-Ion, it is clear that a charger built for a specific vehicle or specific vehicle manufacturer would be

able to assume a specific charger chemistry. Importing a battery-classification lookup table into a charger permanently wired to a single *known* battery serves no purpose.

75. In my opinion, the proposed combination is not what a POSITA would have done but instead reflects hindsight reasoning. It appears that the Petitioner needs Hobbs to attempt to justify its proposed construction of “predetermined threshold level of charge,” and it therefore combines Hobbs’ complex “current threshold” system together with Sutardja for the “substantial completion” alert. However, in doing so, Petitioner does not address a fundamentally important question: Why would a POSITA turn to Hobbs’s *universal* battery charger when Sutardja is directed to a specific type of charger—a *vehicle* battery charger—that has no need to identify different battery types and thus has no need for any of Hobbs’ “current threshold” functionality? There is clearly no reason to do so, because Sutardja is specific to vehicles and has no need for a universal charger that identifies battery type/chemistry.

76. Second, even if a POSITA had been driven to merge Hobbs’s universal-charger, current-threshold-based system with Sutardja, the Petition offers no explanation of how Hobbs’s highly complex, bulky *external* charger 100 feature could be implemented in the *on-board* vehicle charger of Sutardja. Ex. 1006 ¶ [0007] (“[M]any chargers have been *bulky and heavy*, and a need exists to reduce their size,

mass, or both.”). The Petition proposes taking the functionality of that bulky *external* universal charger 100 (red below) and importing it into Sutardja’s *on-board* vehicle charger. Pet. at 18-19.



77. The Petition explicitly proposes that a “POSITA would have appreciated once the user inputs Sutardja’s desired charge amount (predetermined levels of charge), *Hobbs* would look up the associated current threshold in *Hobbs*’ *look-up table* to Sutardja’s charge amount” based on charger 100. Pet. at 19. The Petition does not offer any evidence that a POSITA would have had a reasonable expectation of success by incorporating this complex functionality from Hobbs’ bulky external charger 100 into the on-board battery charger of Sutardja. Indeed, the Petition does not address the fact that Hobbs is directed toward a fundamentally

different and more complex universal battery charging system, which is “bulky” (as depicted) precisely because it must have the capability to accommodate the various current charge levels of many battery types and to identify batteries by type. Ex. 1006 ¶ [0007] (“[M]any chargers have been *bulky and heavy*, and a need exists to reduce their size, mass, or both.”); *id.*, Abstract (“Chargers may automatically charge at the correct battery voltage for various types of batteries” and “[m]ethods of charging include identifying *the battery type*....”).

78. Third, in my opinion, Sutardja’s user-input *charge-level* parameter and Hobbs’s separate, hardware-derived *current* threshold are two conceptually distinct thresholds. Hobbs depends on a *current*-based, look-up-table value rather than the user-input *charge*-percentage value that the Petition attributes to Sutardja. Hobbs teaches a battery charger that monitors “whether the charging current has dipped below a *current* threshold (step 337).” Ex. 1006 ¶ [0107]. That “current threshold” is “stored in look-up table 272 for ... battery 152,” is specific to the type of battery pack being charged, and is automatically selected by the system. *Id.* Hobbs’s charger stops charging, or indicates that charging is complete, when the charging current drops below the current threshold. *Id.* ¶ [0109].

79. Hobbs’s current threshold is a measurement of the rate at which charge *flows* (e.g., electrons), not a measurement of the amount of energy *stored* in the battery. Indeed, the formula for current is $I = \frac{V}{R}$ whereas the formula for energy

storage in an electric vehicle battery is *State of Charge (SOC)* = $\frac{Q_{rem}}{Q_{Rated}}$, where

Q_{rem} is the remaining energy capacity usable (in kWh or Ah) and Q_{rated} is the total rated or original maximum capacity of the battery when new, which degrades over time. These are fundamentally distinct physical parameters: a current threshold is the rate at which charge is *being pushed* to the battery,⁵ while a charge-level threshold tells the charger how *much energy the battery has accumulated*. Further, Hobbs calls out a specific combination of constant-current charging followed by constant-voltage charging. This is standard for charging a wide variety of batteries, and it has the advantage that the battery's behavior dictates end of charge. The current steadily declines in constant-voltage mode because it is nearing full charge. This has the advantage of not requiring any specific knowledge of charge state or capacity, which is why it is usable across a wide variety of batteries. Claim 1 requires "data indicative of a predetermined threshold level of charge," meaning a level of energy storage, not a rate of charge flow. Moreover, throughout a battery charge, the voltage is modified in addition to the current, and thus current alone cannot tell one

⁵ A current threshold may be implemented for a number of reasons, such as limiting the maximum current that can be supplied to a battery system without overloading the conductors, or to provide a minimum threshold under which it is impractical to continue powering the various power electronics and charging can be safely assumed to be concluded.

how fast energy is flowing. Consequently, a POSITA would find it illogical to implement Hobbs' current threshold system into Sutardja as proposed by the Petitioner.

80. The Petition attempts to bridge the gap in these two disparate parameters through testimony discussing Ohm's law. Pet., 19 (citing Ex. 1003 ¶ 124). However, that only underscores the problem to a POSITA: a proportional relationship between voltage and current at a given resistance says nothing about how much charge a particular battery has accumulated, which is why Hobbs's current thresholds must be indexed to battery type in the first place. Ex. 1006 ¶¶ [0052], [0107]. A POSITA would have recognized that estimating the amount of charge in a battery is technically difficult and considerably more complicated than waiting to switch from constant-current to constant-voltage charging. For example, there are many patents that relate to power charge estimation, particularly as the *total charge changes* as the battery ages from use and calendar aging. Different battery chemistries require vastly different approaches to making such estimations. For example, lithium ion phosphate batteries ("LPF batteries") require a vastly different approach to charge estimation as compared to, for example, nickel cobalt manganese batteries ("NCM batteries"), just as lithium and nickel batteries have completely different methods for monitoring and managing charge.

81. The Petition does not explain how Hobbs’s *external* current-threshold-based charging system would even be operable with, or could be incorporated into, Sutardja’s fundamentally different *on-board* charger system. A POSITA would have found this enormously difficult to do, if not impossible. Even if possible, making this modification would have been highly complex, and the Petition addresses none of the many different technical issues a POSITA would have faced in making the modification.

82. Fourth, the Petition’s stated rationale—that the modification would “improve user convenience by notifying users the vehicle is ready for use ... while still permitting continued charging to a higher charging endpoint” (Pet., 16)—is, in my opinion, irreconcilable with the expressly stated purpose of *both* references.

83. Sutardja’s stated object is *not* user convenience; it is alleviating the load that mass simultaneous vehicle charging places on the *utility’s* distribution system. Sutardja explains that because “[m]any people arrive home after work at about the same time such as between 5 pm and 7 pm,” “the demand for power may exceed the available supply,” and “the load on a power distribution system of the utility company 23 may significantly increase.” Ex. 1004 ¶¶ [0229]-[0230]. Sutardja’s solution is that “utility companies may employ a charge management system (CMS) to coordinate charging of batteries in vehicles at multiple locations,” and may even “take back charge from selected ones of the batteries via the CMS to facilitate load

management.” *Id.* ¶¶ [0231]-[0232]. The user interface module 108 correspondingly exists to let the user “generate default and/or custom charging parameters” *up front*—charging times, a charge completion time, a priority, an expected time of next use, and acceptable costs—which the CMM conveys to the utility for scheduling. *Id.* ¶¶ [0234]-[0236], [0253]. Sutardja is clear about what comes next: the user “may request a full charge daily between 9 pm and 6 am,” and “[t]he utility company 23 may charge the battery 14 between 9 pm and 6 am *without interacting with the user.*” *Id.* ¶ [0262]. A POSITA would recognize that the system of Sutardja is created to *remove* the user from the charging session for the advantage of *the utility company* power grid, not to disturb the user partway through it with an alert.

84. In my opinion, the Petition’s asserted benefit is not merely absent from Sutardja; it is affirmatively *counterproductive* there. An alert has no value to a user who is at home overnight or at work for the day, because that user *expects* the vehicle to have the desired “driving range” (Pet., 16) whenever the user leaves. Indeed, providing an alert at, *e.g.*, 3 AM, would be annoying. Moreover, Sutardja’s utility does not charge to whatever endpoint a user might later prefer; it executes a schedule built from the charge levels and completion times the user provided in advance, supplying power “in a staggered manner to multiple users” so that it can “control charging times ... of the batteries in multiple vehicles *without loading the power distribution system.*” Ex. 1004 ¶ [0263]. A user who departs mid-schedule in

response to an alert defeats that coordination, and unplanned charging beyond the scheduled level is precisely the uncoordinated demand Sutardja exists to prevent. *Id.* ¶¶ [0229]-[0231]. Indeed, Sutardja contemplates the opposite of topping off: where a user does not need the battery immediately, the CMS may ***take charge back out*** of the battery and “recharge these batteries later during periods of lower demand.” Ex. 1004 ¶ [0231]. In other words, Sutardja contemplates extended vehicle charging sessions where the battery *far exceeds* the level of charge needed by the user, in which case charge is actually taken back by the utility company.

85. Hobbs does not provide the missing rationale either, because Hobbs asserts its own different rationale. The reason charger 100 may “indicate that charging is complete at one current threshold ... and stop charging at a lower current threshold” is to “facilitate ***minimizing the charging time if the user is waiting*** for the charge to be completed, but ***maximizing the amount of charging that takes place if the user is not ready to use***, for example, vehicle 150,” together with the battery-health benefit of “giving it a deeper charge periodically.” Ex. 1006 ¶ [0111]. That is a throughput-and-battery-care justification for a ***public, pay-per-use*** machine serving a variety of unknown battery types—not a rationale for informing a user that a self-selected trip-readiness level has been reached. Hobbs never describes its indication as confirming that the vehicle is “ready for use” at a user-chosen level, and Hobbs’s charger has no notion of the planned trip or driving-range planning on

which the Petition’s rationale depends. Moreover, a POSITA would understand that giving a “deeper charge periodically” is unhealthy for both vehicle batteries and lithium ion batteries generally.

86. Fifth, the Petition’s arguments regarding reasonable expectation of success do not demonstrate a reasonable expectation of success in integrating Hobbs’ complex current-threshold system from its *bulky external*, pay-per-use, *universal* charger 100 with the *on-board vehicle* charger of Sutardja. The Petition’s entire analysis is that a “POSITA would have had a REOS in incorporating Hobbs’s threshold-notification functionality into Sutardja’s charging-management system and the inclusion of a second threshold, a charge level lower than a full charge level.” Pet., 17. Mr. Andrews’s testimony is likewise vague, as it does not address how the current-threshold system of Hobbs would be incorporated into Sutardja. Indeed, Mr. Andrews’s testimony that “this modification would have had a reasonable expectation of success because only straightforward and routine *changes to programming instructions* would have been required” is, in my opinion, not supported. Ex. 1003 ¶ 120. The Petition proposes blending Hobbs’s complex current-threshold look-up table system with Sutardja—something that would involve substantial *hardware* alterations to Sutardja’s on-board vehicle charger. Many battery controllers are essentially hardware elements, incapable of alteration, for simplicity and because the algorithm for charging a specific chemistry is fixed.

A POSITA would have had no reasonable expectation of success in making these alterations, particularly given that Hobbs' charger is an *external universal* battery charger and Sutardja's is an *on-board vehicle* charger.

b. Whether the Combination Possesses All Claim Limitations.

87. Even if the prior art could be combined as the Petition suggests, in my opinion, the combination would still not teach “data indicative of a predetermined threshold level of charge by which the controller sends an alert” received “*via a user-manipulatable control*.” There are two independent reasons for my opinion.

88. First, Hobbs does not teach that a user may input a level of charge at all; the Petition's contrary characterization of Hobbs is unsupported by the reference. The transition from constant-current to constant-voltage is driven by battery behavior, as is the battery's slowly declining current in constant-voltage mode. These are not user-settable phenomena. The Petition acknowledges that Sutardja does not teach “a level of charge that is less than the charge level at which charging stops,” which is the Petition's expressly applied construction for “threshold level of charge.” Pet., 12.

89. To account for that missing feature, the Petition proposes modifying Sutardja based on Hobbs' alleged teaching of the “substantially complete” alert, which the Petition contends constitutes a “second charge threshold, less than a full charge, at which the controller sends an alert.” Pet., 14. However, Hobbs does not

teach that the *user* may input a battery *charge level* at all. The Petition depends on Hobbs’s teaching that “fast or opportunity charging may take place for *a particular amount of time* or *energy*, for example, entered by the user into key pad 104” (Ex. 1006 ¶ [0111]) and tries to tie that statement to the following statement: “when a certain amount of charging has been completed or the charge of battery 152 reaches *a certain level*, charger 100 may indicate that charging is complete (step 339) or substantially complete.” *Id.*; *see also* Pet., 14. But a “particular amount of . . . energy” set by the user is not the same as “a certain level” of “charge of battery”—the former refers to *the amount of power* to be delivered to the battery, without regard to the battery’s resulting level of charge. The two are not interchangeable: delivering a fixed quantity of energy (e.g., 10 kWh) yields different resulting charge levels depending on the battery’s capacity and its state of charge when charging began—which is precisely why Hobbs must first identify the battery type in look-up table 272. Ex. 1006 ¶¶ [0052], [0107].

90. Nothing in Hobbs teaches that the charger allows a user to input the particular charge level sought; it teaches only that the user can input an amount of *time* (e.g., 30 minutes) or *energy* (e.g., kWh), and *solely for purposes of “fast or opportunity charging.”* *Id.* ¶ [0111]. Neither input is a level of charge of the battery—that is, the extent to which the battery is charged (e.g., 50%). Consequently, Hobbs does not teach a user-input level of battery charge, which is a requirement of

the claimed “predetermined threshold level of charge.” A POSITA would have understood that Hobbs is simply performing constant-current charging followed by constant-voltage charging, and that the transition between those phases is only *loosely correlated* with the battery’s actual level of charge. That boundary is moreover dictated by the *controller* (and the battery), not by the user: Hobbs’s charger detects how the battery behaves during charging and adjusts accordingly. *Id.*

91. The relevant principles of operation confirm the point. Both thresholds Petitioner relies on sit within Hobbs’s *constant voltage* phase 330, where charger 100 “gradually reduce[s] the charging power level to maintain the same charging voltage” until “a reduction in charging current indicates that charging is complete.” Ex. 1006 ¶ [0073]; *see also id.* ¶¶ [0107]-[0108]. Both the “complete” indication and the stop-charging point are therefore *current* values detected as the charging taper proceeds—an artifact of how a battery of the identified type accepts charge near the end of a charging cycle, not a level the user dials in. Specifically, the user would allegedly dial in a percentage state of charge (“SOC”) per Sutardja (e.g., 80%). This would then be estimated on a voltage basis or on a coulomb (“C”) basis. This would be used to adjust constant-current (“CC”) or constant-voltage (“CV”) CC or CV and create any taper or final cutoff. This is very indirect, and the current values can be mapped wildly differently regardless of a user specifying a particular SOC.

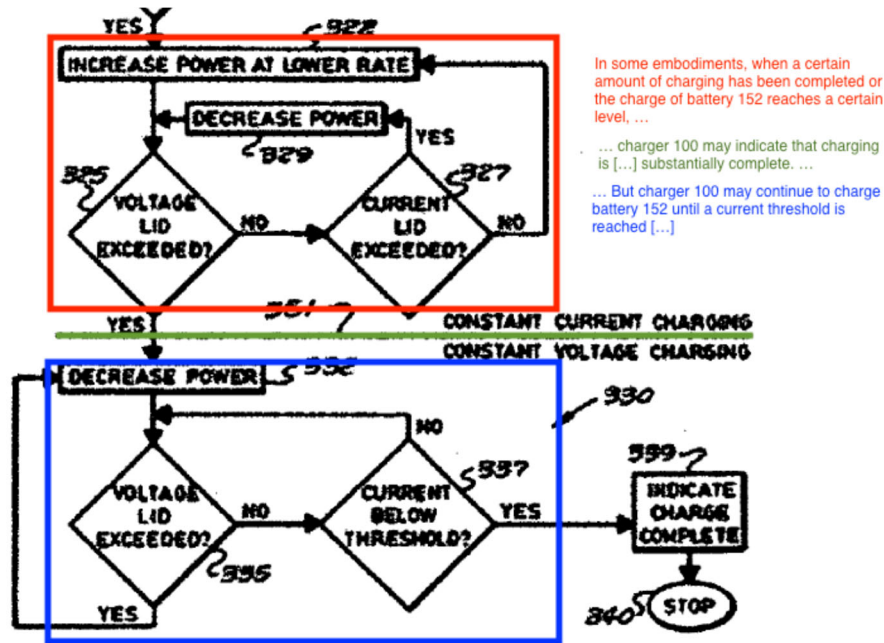
92. Second, even accepting as true that Hobbs permitted a user to input a “level of charge” of the battery, Hobbs does *not* teach that any such input *triggers* the “substantial completion” alert. Claim 1[e][i] requires that the “data indicative of a predetermined threshold level of charge” be “receive[d], via a *user-manipulatable* control,” so for Hobbs to teach this limitation under Petitioner’s proposed construction it must teach that the “substantial completion” alert threshold itself is *user-defined*. It does not.

93. The only user inputs Hobbs describes are an amount of time or energy for fast or opportunity charging: “fast or opportunity charging may take place for a particular amount of time or energy, for example, *entered by the user into key pad 104* ... when a certain amount of charging has been completed or the charge of battery 152 reaches a certain level, charger 100 may indicate that charging is *complete or substantially complete*.” Ex. 1006 ¶ [0111]. Hobbs nowhere teaches that the “*amount of time or energy entered by the user into the key pad*” triggers the indication that charging is substantially complete. A POSITA would instead understand that the “substantially complete” alert issues automatically when the charging current falls below a *system-determined current threshold stored in look-up table 272*—a value Hobbs expressly states is “selected (e.g., by controller 270) *based on the type of* battery pack or battery,” not by the user. Ex. 1006 ¶ [0107].

The decision to alert at that point is a design choice made by the **charger manufacturer** for its own reasons, not a level the user dials in. *Id.* ¶ [0111].

94. The look-up table in Hobbs is designed to identify the appropriate current-threshold cut-off **based on battery type**; it is not a user-input threshold, as the claim requires for data indicative of the predetermined threshold level of charge received “via a user-manipulatable control.” Indeed, every charging parameter in Hobbs (Ex. 1006)—e.g., starting power level (¶ [0080]), voltage lid (¶ [0098]), current lid (¶ [0102]), current threshold (¶ [0107])—comes from table 272, which is keyed to battery type. Nothing in the charging profile is user-defined. Petitioner’s theory is therefore internally inconsistent: the very look-up value it relies on to supply the claimed threshold is, by Hobbs’s own terms, selected by the controller rather than obtained from the user. And that gap is dispositive: the prosecution history confirms that this very requirement—user-supplied data controlling *when* a below-full-charge alert issues—was a basis for the claims overcoming prior art disclosing a fixed, system-set completion alarm. Ex. 1002, 183-84, 199.

95. Petitioner’s annotations to Figure 2 of Hobbs (reproduced below) do not cure this fundamental flaw.



Pet., 15. As discussed above, Hobbs does not teach that the green line (i.e., the “substantially complete” indication) is based on a threshold level *set by the user*. It cannot be, because it indicates the charger’s observation of the battery’s behavior. Ex. 1006 ¶¶ [0013], [0109], [0110]. A POSITA would further understand that Hobbs’s disclosure of only a “substantial completion” notification—and no other notification thresholds (e.g., 25%, 50%) apart from “complete”—confirms that the threshold is a system setting rather than a user-defined one. *Id.* The only reason “substantial completion” matters at all in Hobbs is that Hobbs proceeds to lower-current “trickle” charging afterward and because Hobbs is directed to a *public, pay-per-use, universal* battery charger where it makes sense to summon the user back to the charger—not a home or work vehicle-specific charger like Sutardja’s where the vehicle is expected to remain on-site for charging for so long that the utility company

takes overcharged energy back from the battery. Indeed, in the embodiments of Sutardja, the user is actually likely to be asleep when charging.

96. Moreover, in Hobbs, the current threshold is dictated by battery safety and general battery principles, not by any user settings. In other words, it confirms why Hobbs uses a lookup table and that the threshold is not user-settable. Indeed, this threshold is crucial for safely charging a wide variety of battery chemistries and battery capacities and putting it in the hands of the user would literally be dangerous.

97. Thus, even if Hobbs could be combined with Sutardja, the result would be an *automated* “substantial completion” alert issued by the system as the battery neared the charge level the user entered in Sutardja. The alert threshold itself would remain exactly what it is in Hobbs—a value the controller automatically selects—while the claim requires the opposite: that the data defining the threshold “by which the controller sends an alert” be “receive[d], via a *user-manipulatable control*.”

4. Claim 1[e][iii]: “the battery charger controller configured to ... compare, during charging of the battery with the battery charger, a level of charge of the battery to the predetermined threshold level of charge, and”

a. Technical Analysis of the Obviousness Rationales.

98. As explained with respect to Claim 1[e][i]-[ii], there would have been no motivation to combine Hobbs’ current-threshold based system (specifically for a universal charger) with Sutardja, nor a reasonable expectation of success in using

Hobbs' current threshold look-up table (for a universal charger) with Sutardja's residential/work electric vehicle charging system. *Supra* Section VII.A.3.a.

b. Whether the Combination Possesses All Claim Limitations.

99. Even assuming the Sutardja-Hobbs combination would have been combined, the combination does not possess all claim elements.

100. First, as discussed above with respect to Claim 1[d], the Petition does not explain how the "charge exchange module 106" constitutes or forms part of the claimed "controller," especially given that Sutardja explicitly identifies element 112 as the "control module." *Supra* Section VII.A.2. The Petition relies entirely on Sutardja's "charge exchange module 106," as altered by Hobbs, for this limitation. Pet. 17-18. However, even if the charge exchange module 106 were altered as proposed, this would not address the absence of an explanation for how the charge exchange module 106 qualifies as being part of the claimed "controller." *Supra* Section VII.A.2.

101. Second, the Petition presents a technically problematic position that a "POSITA would have appreciated [that] once the user inputs Sutardja's desired charge amount (predetermined levels of charge), Hobbs would look up the associated *current* threshold in Hobbs's look-up table *to Sutardja's charge amount*." Pet., 19. However, Hobbs teaches that "[l]ook-up table 272 may be used to store information on various types of batteries that may be charged by charger

100,” and that it “may be part of a battery classifier or system configured to identify the *type* of battery pack or battery (e.g., 152) being charged,” including “the nominal or open-circuit *voltage*, the maximum or optimal *charging voltage*, the threshold *current or current at which* charging should be stopped.” Ex. 1006 ¶ [0052]. Hobbs further teaches that “[t]his current threshold may be stored in look-up table 272 *for the particular type battery pack or battery* (e.g., battery 152, as identified in step 310). In other words, the threshold may be selected (e.g., by controller 270) *based on the type of* battery pack or battery (e.g., battery 152) or based on the open-circuit voltage (e.g., measured in Step 308).” *Id.* ¶ [0107]. From a technical standpoint, the look-up table is specifically designed for identifying the current threshold associated with battery type and controlling current accordingly—there is no technical basis for concluding that the look-up table correlates in any way to Sutardja’s purported “charge amount.” Furthermore, the Petition provides no technical explanation as to how Hobbs’ complex current-threshold system, designed for a pay-per-use, universal battery charger, could reasonably be expected to be incorporated into Sutardja’s on-board vehicle battery charger. *Supra* Section VII.A.3.a.

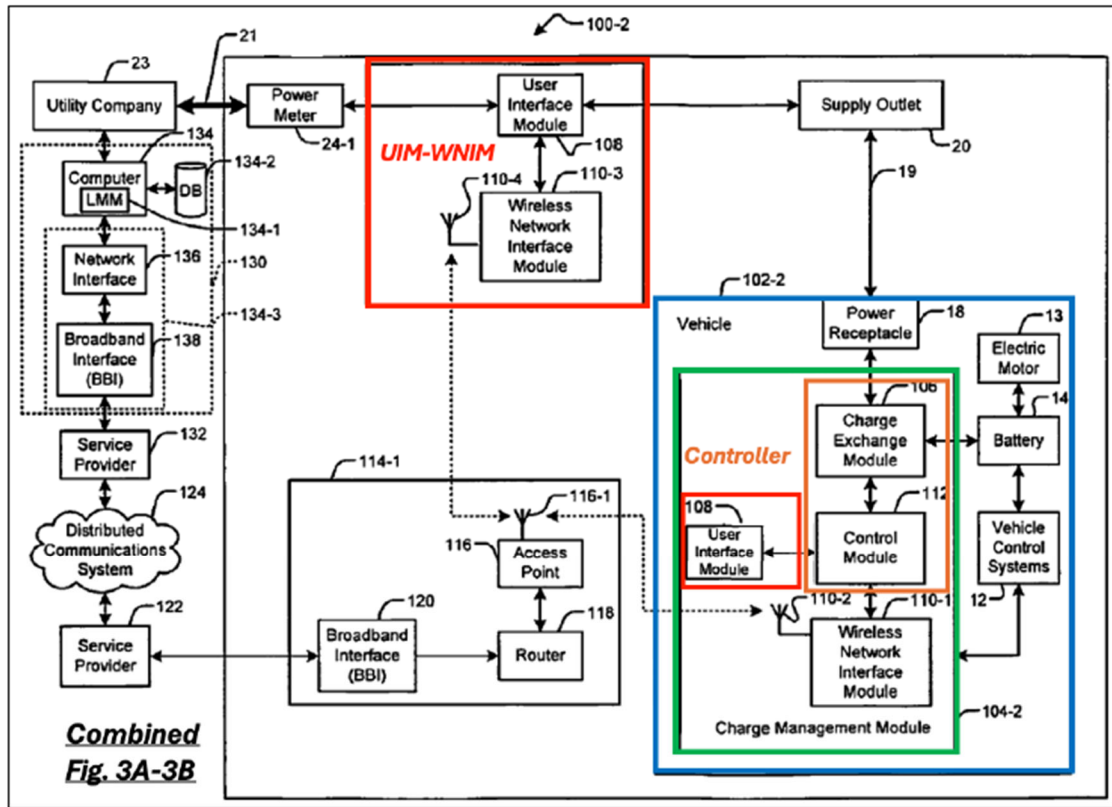
- 5. Claim 1[f]-[g]: “[f] a portable controller remote from the vehicle and battery charger, the portable controller configured to wirelessly communicate with the controller of the battery charger via the transmitter; [g] wherein the portable controller generates a notification to a user indicating the predetermined threshold level of charge of the battery following and as the result of receiving the at least one signal indicative of the predetermined threshold level of charge of the battery.”**

102. The Petition acknowledges that Sutardja-Hobbs does not teach a “portable controller remote from the vehicle and battery charger” as claimed. To overcome this limitation, the Petition first proposes merging the Figure 3A and Figure 3B embodiments of Sutardja into a single embodiment (together with features added via Hobbs), and then further altering that constructed embodiment to incorporate a “portable controller” based on Kelty-078. Pet., 29-32. In my technical opinion, this multi-layer obviousness combination is not adequately supported.

a. Technical Analysis of the Obviousness Rationales

i. Rationales for Combining Figures 3A and 3B.

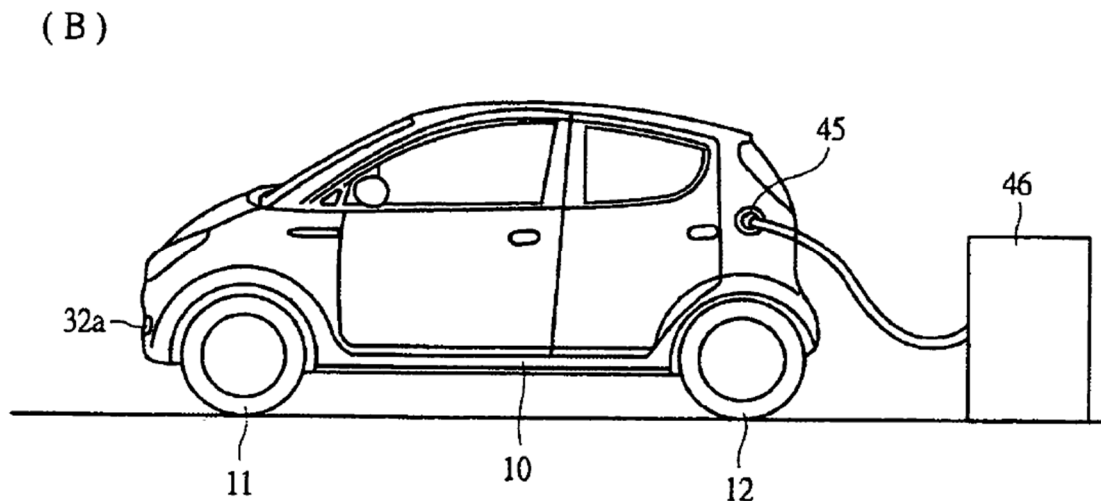
103. Petitioner proposes merging Figures 3A and 3B of Sutardja to create a hypothetical embodiment:



Pet., 27-29. The Petition contends that a “POSITA would have recognized the UIM 108 of Fig. 3A (providing a local display/input interface coupled to the charger) and the user interface outside of the vehicle configuration of Fig. 3B are complementary, and combining them *would allow both local and remote interaction* with the same charging system.... Such a combination would have been consistent with well-known EV charging system design practices prior to the priority date of the ’107 Patent.” *Id.*, 29. However, a POSITA would have had no motivation to modify Sutardja as proposed by the Petition.

104. Sutardja is directed to a *home or work* battery charging system. *Supra* Section VII.A.3.a. Sutardja teaches that the user interface module 108 may be in the

vehicle (FIG. 3A) or, *alternatively*, outside the vehicle (FIG. 3B), for the straightforward reason that there is no purpose in having an identical user interface module 108 in two locations *within feet of one another*. A POSITA would understand that at the time of the invention, and to this day, vehicles park *adjacent* to the charger power supply because charging cables and their vehicle connectors are thick, would present a tripping hazard, require low electrical resistance so as not to overheat, and would risk being damaged if extended any meaningful distance. The cable's thickness is not an arbitrary design choice—it reduces electrical resistance and minimizes heating as the cable carries the currents required to charge the battery; the same reason Jumper cables are also thick. Figure 4(B) of U.S. Patent No. 8,427,103 exemplifies this—it shows a vehicle charger 46 within feet of the vehicle 10 being charged via a thick cable:



Ex. 2013; *see also* Ex. 2014, Fig. 2 (showing thick cable 70 connecting charging

station 62 to electric vehicle 12).

105. Petitioner's own website shows that the power supply resides adjacent the vehicle being charged and that the wall-charger does *not* have a user interface for inputting charge levels:



106. A POSITA would understand that this is why Sutardja presents FIGS. 3A and 3B as alternatives—it does not teach or suggest a system having the user interface module 108 in both places (i.e., feet apart). *See* Ex. 1004 ¶ [0234] (“The user interface modules may be arranged inside vehicles as shown in FIGS. 3A, 4A, and 5A **or** outside vehicles as shown in FIGS. 3B, 4B, and 5B.”), [0241], [0247]. From a technical perspective, a POSITA would not find it logical to include the user interface module 108 both in the vehicle and feet away from the vehicle at the source of power.

107. The Petition’s own admissions are notable in this regard. The Petition admits that “Sutardja explains *other than the placement* of the UIM and WNIM, the embodiments in Fig. 3A and 3B are ‘substantially similar’” and “[b]oth *embodiments perform the same underlying functions*, including receiving user-defined charging parameters, communicating with external systems (e.g., utility providers and remote computing devices), and controlling charging of the vehicle battery based on those parameters.” Pet., 29. Because both embodiments “perform the same underlying functions” and the only difference is the “placement” of the user interfaces either in the vehicle or *within feet* of the vehicle, there is no technical reason to combine them together. Stated differently, a POSITA would not identify a shortcoming in Sutardja that the combined Figure 3A/3B embodiment would solve.

108. Recognizing this, the Petition incorrectly characterizes the hypothetical embodiment as “allow[ing] both local and *remote* interaction with the same charging system.” Pet., 29. However, both interfaces in the hypothetical embodiment are local—just as a “local area network” is local. Sutardja explicitly teaches that the user interface module 108 of Figure 3B is “outside a vehicle 102-2” and depicts it adjacent to both the supply outlet 20 and the vehicle 102-2. Ex. 1004 ¶ [0247]. Accordingly, characterizing the external interface 108 in the hypothetical embodiment as “remote” is simply not accurate—it sits feet away from the vehicle and from the internal interface 108, and is therefore local. In fact, the Petition later contradicts its own “remote” characterization when it argues that having both the internal and external interface 108 “would improve system flexibility by enabling both *local* control by the user and remote coordination with utility systems.” Pet., 30. Moreover, having *only* the internal interface 108 or *only* the external interface 108 allows “local control by the user” and remote coordination with the utility—having *both* does not “improve system flexibility” as alleged.

109. The Petition also relies on Mr. Andrews for the proposition that the combination “would have been consistent with well-known EV charging system design practices prior to the priority date of the ’107 Patent.” Ex. 1003 ¶ 143 (cited by Pet., 29). The only evidence cited by Mr. Andrews is Hobbs’ teaching of “both a battery charger side user interface (Hobbs’ key pad 104 and screen 107) and a user

interface outside the vehicle (Hobbs' diagnostic device 130).” *Id.* However, as he acknowledges, Hobbs is directed toward a ***public universal battery*** charger, and the “user interface outside the vehicle” is ***a diagnostic device of the company operating the charger***. There may be a legitimate reason to have a “remote” diagnostic device interface in Hobbs' context (e.g., to allow the charger company to diagnose problems with the charger remotely), but no such reason exists for an additional user interface 108 in the context of Sutardja. Unlike the hypothetical embodiment where the internal and external user interfaces 108 “perform the same underlying function” (as stated by the Petition at p. 29), the diagnostic device 130 of Hobbs performs a much different function than the user interface of Hobbs' charger and is *not* even a device of the “user” of the charger.

110. Mr. Andrews also argues that “it was well known that the user may be charging a vehicle away from home and would wish to sit in their vehicle while it charges; in this scenario, the user would greatly benefit from a user interface inside the vehicle.” Ex. 1003 ¶ 144. However, Mr. Andrews provides no evidence to support the statement that people would “sit in their vehicle” while the vehicle charges ***at home or at work*** (i.e., the context of Sutardja). From a practical standpoint, an individual charging a vehicle at home or work would simply wait in their house or office while the vehicle charges—there is no reason to “sit in their vehicle” to wait for the charging to finish. Moreover, his testimony that such people

would “greatly” benefit from a user interface 108 in the vehicle when there is one located at the charger *literally feet away* is not explained. And even if the vehicle interface 108 would “greatly benefit” the user as alleged, then there would be no apparent need for the user interface 108 located outside the vehicle. Thus, these positions appear inconsistent.

111. The Petition next argues that having two user interface modules 108 adjacent to one another “would improve system flexibility by enabling both local control by the user and remote coordination with utility systems, which were known to manage charging based on load and cost considerations.” Pet., 30. This does not follow logically, because “local control by the user” and “remote coordination with utility systems” is accomplished, in Sutardja, by *a single* user interface module 108—whether located in the vehicle or outside it. Neither the Petition nor Mr. Andrews explains how having two interfaces 108 within feet of one another would actually improve system flexibility. And while Mr. Andrews cites Sutardja and Kelty-218, he cites them only for the general proposition that charging can be scheduled based on energy costs (Ex. 1003 ¶ 145)—which does not address whether a POSITA would have had a reason to install two user interface modules 108 feet apart.

112. The Petition also argues that the combined embodiment “would facilitate more efficient implementation of user-defined charging preferences—such

as scheduling and cost-based charging—which were known to depend on both user input and communication with external systems.” Pet., 30. However, as with the point immediately above, the Petition does not explain how having two user interfaces 108 as shown in combined Figure 3 would “facilitate more efficient implementation.” If anything, the system is now much more complicated since there are two potentially differently used control panels (e.g., representing additional points of potential hardware failure).

113. In summary, nothing in Hobbs supports that it would have been obvious to implement the user interface 108 of the home/work charger of Sutardja both inside and within feet outside the vehicle. Indeed, the Petition’s own commercial EV battery charger does *not* have an interface on the wall-mounted charger—for the apparent reason that it is unnecessary given that the vehicle itself has the necessary interface. *See* Ex. 2015 at 2, 4. Moreover, because there would have been no identifiable benefit to having the user interface 108 both inside and outside the vehicle as depicted in the hypothetical embodiment, the increased cost and complexity associated with adding an additional user interface 108 would have discouraged a POSITA from doing so.

ii. Rationales for Kelty-078’s Mobile Phone Alerts.

114. Even if the Petition’s hypothetical Figure 3A/3B embodiment would have been obvious, it would not have been obvious to a POSITA to further modify

that embodiment to incorporate mobile-phone alerts as taught by Kelty-078. There are several independent reasons for my opinion.

115. First, a POSITA would have had no reason—and no logical basis—to add remote mobile-phone notification and control functionality to a charging system that Sutardja expressly situates at the user’s home or work location, where the user is present with or near the vehicle for the entire, extended charging session.

116. Sutardja is unambiguous about the physical setting of the Figure 3A and 3B embodiments. Sutardja states that “[i]n FIG. 3A, a CMS 100-1 is shown. A vehicle 102-1 is charged at a location such as a *home or work location*.” Ex. 1004 ¶ [0239]. Figure 3B is the same system with the user interface module 108 relocated to a position “outside a vehicle 102-2” and adjacent to the power meter 24-1 and/or the supply outlet 20. *Id.* ¶ [0247]. Petitioner’s hypothetical combined embodiment is therefore, on Petitioner’s own account of it, a fixed home or workplace charging installation with the vehicle parked at the outlet and a user interface within a few feet of the vehicle.

117. Sutardja likewise describes charging sessions of extended duration that occur precisely while the user is at that location. Sutardja’s paradigm is the user who “plugs the vehicle 102 into the supply outlet 20 at the end of the day” and “request[s] a full charge daily between 9 pm and 6 am,” after which “[t]he utility company 23 may charge the battery 14 between 9 pm and 6 am *without interacting with the*

user.” Ex. 1004 ¶ [0262]; *see also id.* ¶¶ [0231], [0263]-[0264] (staggered overnight charging windows managed by the utility). The vehicle does not leave, and the user does not leave; the user sets default parameters once and the utility executes them. *Id.* ¶¶ [0235]-[0236], [0262]-[0263]. A POSITA would understand that Sutardja’s charging system is directed toward allowing the *utility company* to avoid overloading the power grid with the added benefit of allowing the user to take advantage of *lower utility cost* charging periods—this requires the charger be a home or work charger where the vehicle remains for very extended periods of time. It also frees up the user in the sense that charging is automated and needs no further user interaction.

118. In this context, a POSITA would have perceived no problem for Kelty-078’s remote functionality to solve. A user who is home overnight, or at work for the day, with the vehicle parked feet from the supply outlet and a user interface module 108 mounted at the outlet itself, has no practical need to be told by text message that the battery has reached a selected level, and no practical need to reach the charger through a cellular network in order to adjust a parameter that can be adjusted by walking to the vehicle or to the interface beside it. The asserted benefit does not appear to be meaningful: the notification would be delivered to a user who is already present, and the remote control would duplicate a local control that the

Petition's own hypothetical embodiment places in two locations within feet of one another. *Supra* Section VII.A.5.a.i.

119. The Petition's own articulation of the motivation is notable in this regard. The Petition asserts that a POSITA would have implemented "Kelty-078's known text messaging alert functionality" so that "the driver of the vehicle advantageously would be notified when the charge was nearing completion *so the user would return to their car,*" and that "[s]uch modification would *eliminate the need for the user to remain with the vehicle during charging.*" Pet., 23. The Petition also argues that the alteration would permit "remotely notifying the user of charging completion, *rather than requiring the user to remain near the vehicle,* repeatedly check the vehicle display, or maintain an active data application." Pet., 24. Each of these rationales presupposes a user who has left the vehicle at a charger and must be summoned back to it. That is the paradigm of Hobbs's *public*, pay-per-use universal charger, where the user may walk to a shop or get coffee because the user has nothing better to do while waiting for the charging to complete. It is not the paradigm of Sutardja, where the user is home for the night or at work for the day and the utility charges the vehicle "without interacting with the user." Ex. 1004 ¶ [0262]. This is a significant issue, because someone who is traveling and needs a quick charge is not going to wait for utility costs to go down. The Hobbs combination thus defeats the

purpose of Sutardja, and the Petition thus appears to import a rationale from one reference's use context and apply it to a different, wholly inapplicable context.

120. Kelty-078 itself underscores the point. The remote-control features Petitioner seeks to import—"powering on and off" charging, discharging the battery "into the electricity or electric grid," and overriding utility charging commands—are directed to remote coordination between the user, the vehicle, and a *utility company*. Ex. 1005, 5:40-52, 6:12-16. Sutardja already performs that coordination natively and comprehensively via the user interfaces 108 and the negotiation of charging and charge-return parameters. Adding Kelty-078's parallel mechanism to Sutardja would add cost, hardware, and failure modes while duplicating functionality Sutardja already has, without any discernable benefit. A POSITA would see no value in adding the properties of Kelty-078 to carry out functions Sutardja already executes.

121. Additionally, obviousness must be assessed from the vantage point of a POSITA *at the time of the invention*, without reference to the patent as a template. The practical realities of the 2008 timeframe further demonstrate the absence of motivation. The Petition does not identify a single *home* or *workplace* charging system of that era that delivered charge-state text alerts to the user. Nor does the Petition account for the cost, carrier dependency, and handset limitations that a POSITA would have weighed before adding cellular messaging hardware and

firmware to a residential charge management module. In 2008, a user could not simply download a smartphone application to add such functionality; the modern application ecosystem did not yet exist, as the first iPhone® was released only in early-2007 and the App Store did not launch until July 2008. Ex. 2022; Ex. 2023. Adding remote charger-control functionality *in 2008* would therefore have required purpose-built handset software and charger firmware—an undertaking that, while possible, would have involved significant added expense and effort. That expense and effort would have outweighed the non-existent benefit to the system of Sutardja, which again is specific to home and work use. Where a modification imposes real cost and complexity and yields no corresponding benefit in the reference’s disclosed environment, a POSITA would have been discouraged from making it rather than motivated to make it.

122. In summary, the Petition begins with Sutardja’s load-management system whose stated object is balancing utility demand across many vehicles charging overnight at *homes and workplaces*. The Petition then arbitrarily constructs a combined Figure 3A/3B embodiment that Sutardja presents in the disjunctive (Ex. 1004 ¶ [0234] (“inside vehicles as shown in FIGS. 3A ... or outside vehicles as shown in FIGS. 3B...”)); layers on a threshold-alert feature drawn from Hobbs’s public, universal, pay-per-use charger (Ex. 1006 ¶¶ [0036], [0111]); and then layers on Kelty-078’s mobile-phone messaging and remote start/stop controls

(Ex. 1005, 4:53-5:1, 5:40-52). This approach does not reflect how a POSITA would have approached the design process. A POSITA in 2008 confronting Sutardja's home and workplace charge management system would not have had a reason to incorporate Kelty-078. Accordingly, in my opinion, this limitation would not have been obvious to a POSITA.

VIII. OPINIONS ON GROUND 2

123. The Petition asserts that the combination of Sutardja, Hobbs, and Kelty-078 renders obvious claims 6-9 of the '107 Patent. Pet., 2. For the reasons set forth below, it is my opinion that this combination would not have rendered any of these claims obvious to a POSITA.

A. Independent Claim 6

1. **Claim 6[a]: “establishing wireless communication between a controller of the vehicular battery charger and a portable controller of a user remote from the vehicle and the vehicular battery charger;”**

124. The Petition incorporates the same motivation-to-combine arguments relied on with respect to Claim 1[f], including combining the embodiments of Figures 3A and 3B into a single embodiment to reach the “portable controller” limitation so that it can justify further relying on Kelty-078. Pet., 42. For the reasons discussed with respect to Claim 1[f]-[g], it is my opinion that the Petition does not demonstrate the obviousness of this limitation. *Supra* Section VII.A.5.

- 2. Claim [6b]: “receiving, via a user-manipulatable control, data indicative of a predetermined threshold level of charge by which the controller sends an alert, the predetermined threshold level of charge being less than a full charge of the battery;”**

125. For the reasons discussed with respect to Claim 1[e][i]-[ii] above, this limitation would not have been obvious to a POSITA. *Supra* Section VII.A.3.

- 3. Claim 6[d]: “comparing, during charging of the battery with the vehicular battery charger, a level of charge of the battery to the predetermined threshold level of charge; and”**

126. For the reasons discussed with respect to Claim 1[e][iii], this limitation would not have been obvious to a POSITA. *Supra* Section VII.A.4.

- 4. Claim 6[e]: “generating and wirelessly transmitting, during the charging of the battery and before the charging of the battery is complete, a signal to the portable controller responsive to detecting the level of charge of the battery reaching the predetermined level of charge of the battery.”**

127. For the reasons discussed with respect to Claim 1[f]-[g], this limitation would not have been obvious to a POSITA. *Supra* Section VII.A.5.

IX. OPINIONS ON GROUND 3

128. The Petition asserts that the combination of Sutardja, Hobbs, Hunt and Kelty-078 renders obvious Claim 1 of the '107 Patent. Pet., 2. For the reasons set forth below, it is my opinion that this combination would not have rendered Claim 1 obvious to a POSITA. *Supra* Section VII.A.

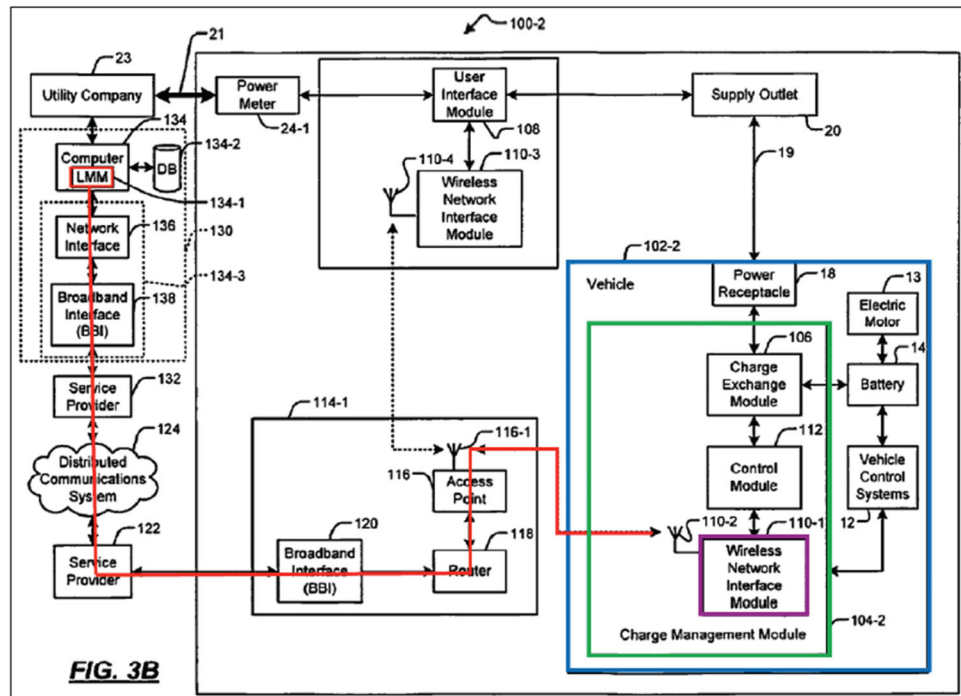
A. Independent Claim 1

1. Claims 1[a]-[e][iii]

129. Although the Petition contends that these limitations are taught by its alternative mapping of Sutardja-Hobbs-Hunt-Kelty-433 (Ground 3), the Petition expressly relies on the same Sutardja-Hobbs mapping and analysis set forth with respect to Claims 1[Pre]-1[e][iii]. Pet., 51. For the reasons set forth above with respect to those limitations, it is my opinion that the combination of proposed prior art would not have rendered Claim 1 obvious. *Supra* Section VII.A.

2. Claims 1[f]-[g]

130. The Petition argues that “[t]o the extent it is argued the *notification* is itself a text generated by the *portable controller*,” the load management module (“LMM”) in computer 134 of Sutardja can be mapped to the “portable controller” recited in Claim 1[f]-[g]. Pet., 50-60. As shown below, the Petition identifies the alleged “controller” 134 of utility company 23 in red:



Pet., 55. The Petition then argues that it would have been obvious to make that controller portable based on Kelty-433 “so battery charge monitoring operations would be performed using portable devices capable of wirelessly communicating with vehicle-charging systems,” positing that “[u]tility company *technicians* might carry portable controllers to install, monitor, and diagnose battery charger installations as they visit customers’ premises.” *Id.* at 56-57.

131. The Petition’s alternative mapping for Claims 1[f]-[g]—in which the “portable controller” is a handheld device of the *utility company* implementing the LMM in computer 134 of utility company 23—is not supported for four independent reasons.

132. First, even setting aside the conclusory nature of the motivation and accepting for the sake of argument that the substitution would have been obvious, the resulting combination does not satisfy Claim 1[g]. That limitation requires that the portable controller “generate[] a notification *to a user* indicating the predetermined threshold level of charge of the battery.” The “user” is a person who supplied the “data indicative of a predetermined threshold level of charge” “via a *user-manipulatable control*” under Claim 1[e][i]—in Sutardja, the vehicle owner who enters charging parameters at user interface module 108. Ex. 1004 ¶ [0235]. Sutardja itself confirms the distinction, consistently treating “the user” and “the utility company 23” as separate actors that *negotiate* with one another over charging parameters. *Id.* ¶¶ [0233], [0238], [0251]. The utility company 23 is not the user, and a notification generated by and displayed on the *utility’s* own handheld device is not a notification “to a user.”

133. The Petition points to the ’107 Patent’s statement that the “other controller can be ... *one or more processors of a server or other computer associated with a power utility* providing power to the vehicle charging cord 22.” Pet., 54 (quoting Ex. 1001, 8:65-9:12). However, that sentence describes where a controller may *reside*; it does not displace Claim 1[g]’s separate and more specific requirement that the notification be generated *to a user*. The specification makes the point expressly: even in the power-utility embodiment, the utility’s controller 50

“automatically generat[es] a text message or e-mail from the controller 50 of the power utility 48 *to a computer, phone, PDA, or other device of the user.*” Ex. 1001, 22:37-50. The utility-side controller is thus an intermediary and the notification still reaches the user. The Petition’s combination incorrectly treats the utility company as the “user.”

134. Second, the Petition does not explain why the utility company 23 would have any reason to receive an alert *before* an individual charging session is complete, which is how the Petition expressly applies the claim under its construction of “predetermined threshold level of charge.” Sutardja’s LMM 134-1 exists to “analyze the load on the distribution system based on the requested charging parameters from *multiple customers*” and to “determine a schedule for charging batteries in multiple vehicles.” Ex. 1004 ¶ [0253]. Nothing in Sutardja suggests that aggregate load management depends on—or would benefit from—a per-vehicle alert issued at an individual customer’s self-selected charge threshold short of completion. To the contrary, Sutardja’s paradigm is that the utility charges the battery overnight “*without interacting with the user.*” *Id.* ¶ [0262]. The Petition identifies no problem such an alert would solve for the utility.

135. Third, the Petition’s own rationale for adding Hunt exposes the difficulty with the proposed combination. The Petition argues:

A POSITA would have been motivated to modify the combined Sutardja-Hobbs-Kelty-433 system to incorporate Hunt's notification-display functionality such that, upon receipt of a signal indicating the battery has reached the predetermined threshold level of charge, Kelty-433's handheld device would generate and display a notification to the user indicating the predetermined threshold level of charge had been reached. EX1003-Dec, ¶218.

A POSITA would have been motivated to incorporate Hunt's "notification indicators or alerts" and "up-to-date feedback" into the Sutardja-Hobbs-Kelty-433 system to *improve consumer awareness and inform users when a desired charge threshold was reached, enabling timely charging and vehicle-use decisions without continuously monitoring the charger.*

Pet., 59. But in the "Sutardja-Hobbs-Kelty-433 system," the "portable controller" is the *utility company's* handheld device 130. *Id.*, 56-57. A notification generated on and displayed by that device provides no "consumer awareness" and informs the consumer of nothing—the utility, not the consumer, receives it.

136. Hunt confirms this mismatch. Hunt's "display/data collector unit 125" is a *consumer-premises* device: it is "user-installable," is "located in the consumer's building(s)," and receives alerts *from* the utility's data center 195 so that "the consumer" may "view" them. Ex. 1008 ¶¶ [0031]-[0032]. Hunt's entire stated purpose is to give the *consumer* visibility that the consumer otherwise lacks. *Id.* ¶¶ [0006]-[0007]. The Petition therefore takes a display that Hunt places *at the*

consumer and relocates it *at the utility*, then invokes Hunt’s consumer-facing benefit to justify the result. Indeed, immediately after invoking “consumer awareness,” the Petition returns to arguing that the notification is generated at the remote LMM 134—*owned and operated by the utility company 23*. Pet., 60. But a POSITA would understand that the utility company 23 is not the “user” or “consumer.”

137. Fourth, the Petition’s “simple substitution” argument is unfounded. Pet., 57. Sutardja’s LMM 134-1 is not a personal monitoring tool; it is the utility’s load-management engine, which receives charging parameters from “multiple vehicles,” analyzes distribution-system load, determines charging schedules across many customers, generates alternate charging parameters, and writes to database 134-2. Ex. 1004 ¶¶ [0252]-[0253]. The Petition offers no explanation of how a handheld device carried between customer premises by a mobile technician would perform grid-scale load management, nor any evidence that a POSITA would have expected it to. A POSITA would readily grasp that no electric utility works this way.

138. Kelty-433 does not supply this explanation either: its “central controller 280” is not an electric-vehicle charging controller at all, but the utility-side counterpart to a stationary consumer “reliability box” installed in a basement or garage for backup power and peak shifting, and Kelty-433 lists “hand-held” only within a list that also includes “a PC, server, ... multiprocessor system, ... mainframe computer, [and] distributed computing environment.” Ex. 1009 ¶¶

[0018]-[0022]. A reference that recites “hand-held” as one item in a list of computing platforms—alongside mainframes—does not teach a POSITA to reimplement a utility’s multi-vehicle load-management computer as a handheld.

139. The Petition’s rationale is also internally inconsistent: Mr. Andrews justifies the substitution on the premise that a *technician* would carry the device to “install, monitor, and diagnose battery charger installations” (Ex. 1003 ¶ 211), yet justifies the Hunt modification on the premise that the same device improves *consumer* awareness (*id.* ¶ 219). Both cannot be true, and the Petition does not reconcile them.

X. OPINIONS ON GROUND 4

The Petition asserts that the combination of Sutardja, Hobbs, Hunt, Kelty-433, Kelty-078 and Kelty-078 renders obvious dependent claim 4 of the ’107 Patent. Pet., 2. Because claim 4 depends from independent claim 1, which is patentable for the reasons discussed above, I have provided no opinions on this ground. However, I reserve the right to opine on this ground should the Board institute trial.

XI. OPINIONS ON GROUND 5

140. The Petition asserts that the combination of Hobbs, Sutardja, and Kelty-078 renders obvious claims 10-12 and 14 of the ’107 Patent. Pet., 2. For the reasons

set forth below, it is my opinion that this combination would not have rendered any of these claims obvious to a POSITA.

B. Independent Claim 10

- 1. 10[d]: “the battery charger controller configured to: wirelessly communicate with the controller of the phone by sending signals via the transmitter”**

a. The Combination Does Not Possess All Claim Limitations.

141. The Petition’s mapping of Claim 10[d] depends entirely on the premise that Hobbs’s “diagnostic device 130” is the claimed “phone.” *See* Pet., 62-65 (mapping “Hobbs’s phone” to the controller with which battery charger 100 wirelessly communicates), 75-76 (referring back to 10[pre] mapping). That premise is not supported. Hobbs never uses the word “phone” to describe “digital diagnostic device” 130, and the objective evidence and understanding of a POSITA confirm that diagnostic device 130 is not a phone.

142. A POSITA would understand that a phone is, by definition, a device with voice communication capability. Ex. 2016 (defining “phone” and “telephone”). This was especially so in 2008, when smartphones were extremely new. Hobbs’s diagnostic device 130 does not have this capability—regardless of whether it utilizes the cellular telephone network to transmit *data*. Nor would there be any reason in Hobbs for the diagnostic device 130 to have that capability; it is designed to diagnose problems with the *charger*, not to enable communication between people. Ex. 1006

¶ [0037] (explaining that diagnostic device 130 is “configured to communicate *with charger 100*”). Indeed, Hobbs makes clear that diagnostic device 130 is intended “to be used by *a technician having more knowledge than a typical user* of charger 100”—not by the vehicle owner. *Id.* Hobbs further explains that diagnostic device 130 is “configured to *diagnose faults within charger 100, program charger 100, provide additional charging information, etc.,*” and it “may also (or instead) allow ... *programming of charger 100.*” Ex. 1006 ¶ [0037]. Diagnostic device 130 is depicted as a basic keypad-and-screen unit tethered to the charger enclosure—it has no disclosed voice capability, nor would it need such capability. *Id.*, Fig. 1. A technician never needs to have a voice conversation with a battery. Even if device 130 could communicate with *other devices*, that communication could not occur by *voice*, which is a required function of a phone. A modern-day tablet computer illustrates the difference: it may permit texting over Wi-Fi or a cellular network (with a modem), but nobody would call it a “phone.”

143. The Petition’s own asserted art forecloses the position that the PDA diagnostic device 130 is equivalent to a phone. Kelty-078 expressly enumerates “a *cell phone, PDA*” as the devices from which a user may communicate with the vehicle. Ex. 1005, 4:58-63. Kelty-078 thus treats a “cell phone” and a “PDA” as *separate and distinct* categories of devices, listed disjunctively. Had a POSITA

regarded a PDA as simply a species of phone, Kelty-078's drafters would have had no reason to recite both.

144. Similarly, the '107 Patent itself states that the "other controller can be one or more processors of a personal computer, **phone**, **PDA**, or other processor-based device associated with a user..." Ex. 1001, 8:67-9:13. The '107 Patent thus treats a "phone" as distinct from a "PDA." The Petition does not account for this distinction and instead argues that all PDAs with "cellular telephony" capabilities qualify as phones—a proposition that is simply wrong.

145. Hobbs itself does not call diagnostic device 130 a phone. Hobbs states only that it "may be a personal digital assistant (PDA)." Ex. 1006 ¶ [0037]. And Hobbs refers to "phones" elsewhere, demonstrating that Hobbs knew how to identify a phone when it meant to. *Id.* ¶ [0003]. The Petition relies entirely on Hobbs's teaching that the diagnostic device 130 uses "cellular telephony." But Hobbs teaches that the "cellular telephony" is used for the diagnostic device 130 to "communicate *with charger 100.*" *Id.* ¶ [0037]. The reference to "cellular telephony" therefore means only that the cellular telephone network carries the device-to-charger communication; it says nothing about the diagnostic device 130 being used for voice communication, which is a required capability of a phone.

146. While the Petition relies on the diagnostic device having a "keypad" (Pet., 63), a POSITA would understand that keypad to be for performing diagnostics

on, and exchanging data with, the battery charger 100. Hobbs teaches in the same breath that “cellular telephony, infrared serial link, or wireless local area network” may be used even though “infrared serial link” and a “wireless local area network” are plainly not phone features—they are data-exchange links, because device 130 exists to perform diagnostics. Ex. 1006 ¶ [0037]. The claims recite a *phone* so that an everyday *end-user* device delivers notifications to the user, not so that a *specialized diagnostic device* conveys them to *the company that owns the charger*. The only reason diagnostic device 130 uses cellular telephony is to exchange diagnostic *data*, not to perform phone functions.

147. The Petition attempts to address this by arguing that “Hobbs’s PDA performs the *fundamental* function of a cellular telephone” and it “was well known that a PDA with cellular telephony and user interface capabilities is a phone.” Pet., 63. In other words, the Petition contends that all PDAs with cellular telephony capabilities are necessarily “phones,” and therefore Hobbs’ digital diagnostic device 130 is a “phone.” However, this is not accurate—the “fundamental function” of a cellular *telephone* is *voice* communication. And, again, it fails to explain why a technician needs voice capability when interfacing with battery chargers.

148. The Petition also relies on Mr. Andrews, who points to the Palm Treo line of PDA-phones to argue that all PDAs with cellular telephony capability would have been understood to be phones. Ex. 1003 ¶ 231. However, the Treo devices had

voice communication functionality, which is what qualified them as phones notwithstanding their PDA capabilities. Cellular telephony can be used for non-voice data transmission (e.g., the diagnostic data taught by Hobbs), for voice data transmission, or for ***both***. The Palm Treo supported both and was therefore a “smartphone,” whereas Hobbs’s diagnostic device 130 has no disclosed voice capability and no need for that capability. Indeed, the user guide for the Petition’s own cited Palm Treo 700p refers to the device as a “smart~~ph~~***phone***,” not a “PDA.” Ex. 1030, 7, 16. It is called a smart~~ph~~***phone*** precisely because it permits voice communication, consistent with the plain meaning of “phone.” And even if some people used “PDA” ***loosely*** to refer to smartphones, the objective evidence of record establishes that a PDA with telephony capabilities is not a phone unless it permits voice communication. Ex. 2016; Ex. 2018 (defining “PDA” without mentioning voice); Ex. 2019 (same). Hobbs, moreover, has no need for a phone, because the communication is between diagnostic device 130 and ***the charger***—not between people. The sole purpose of diagnostic device 130 is to “diagnose faults within charger 100, program charger 100, provide additional charging information, etc.” Ex. 1006 ¶ [0037].

149. Taken together, these disclosures establish that Hobbs’s diagnostic device 130 is structurally and functionally distinct from a phone. Structurally, it is an accessory unit supplied with the charger and connectable to it by a dedicated

service cord (or wirelessly), bearing its own key pad and screen and a service interface to controller 270. Ex. 1006 ¶ [0037], Fig. 1. Functionally, it exists to diagnose charger faults, program the charger, and manually control charging—capabilities directed to a trained technician maintaining the equipment, not to a driver monitoring a charging session. *Id.* Indeed, Hobbs expressly contemplates that diagnostics and manual control may be provided by “*two separate accessory devices*” or by charger 100 itself “via screen 107 and key pad 104”—alternatives that confirm device 130 is an adjunct of the charger rather than a user’s personal mobile phone. *Id.*

150. Because Claim 10 requires “wireless communication with a *phone* having a controller” and requires the battery charger controller to “wirelessly communicate with the controller *of the phone*,” the Petition’s inability to establish that Hobbs discloses a phone is significant for every limitation the Petition maps through “Hobbs’s phone,” including Claims 10[Pre], 10[b], 10[d], and 10[h], as well as dependent Claims 11, 12, and 14. Moreover, even if it would have been obvious to substitute Hobbs’ diagnostic device 130 with a phone (it would not, as explained further below), the Petition has not proposed doing so.

151. And although the Petition does rely on Kelty-078, it is not for the “phone” limitation but instead for a “processor.” Pet., 64 (“To the extent that it is argued Hobbs does not teach a *processor*, a POSITA would be motivated to look to

Kelty-078....”). Indeed, the Petition provides no obviousness rationale explaining why a POSITA would have been motivated to impart voice capabilities to Hobbs’ PDA with cellular telephony, and thus offers no rationales to justify modifying the diagnostic device 130 to be a *phone*. Moreover, a POSITA would understand that Hobbs’ diagnostic device 130 in the form of a PDA would necessarily have a “processor,” and thus there is no motivation to further look toward Kelty-078 for this limitation.

152. Moreover, a POSITA as of the August 2008 priority date would have understood that a device capable of performing the diagnostic functions Hobbs describes required specialized hardware that a consumer cellular telephone or general-purpose PDA did not possess. Hobbs’s diagnostic device 130 is not a passive display; it is “configured to *diagnose faults within charger 100, program charger 100*, provide additional charging information, etc.,” and it “may also (or instead) allow ... *programming of charger 100*.” Ex. 1006 ¶ [0037]. A POSITA would not have expected an off-the-shelf handset (or PDA) to perform such functions in 2008. Nor could such functionality have been added after the fact by downloading a phone “app,” because downloadable phone apps were essentially nonexistent in 2008.

153. The commercial realities of the period reinforce this understanding. The Petition’s expert asserts only that “[i]t was well known that PDA phone devices (e.g., the Palm Treo) received texts.” Ex. 1003 ¶¶ 272-273. Whether a Treo could receive

a text message says nothing about whether a Treo could diagnose faults in, or manually control the output of, a high-power industrial battery charger. The Petition identifies no handset of that era—or of any era—capable of performing the functions Hobbs assigns to diagnostic device 130.

154. Because Hobbs’ diagnostic device 130 is not a phone and the Petition does not present evidence that it would have been obvious to replace the diagnostic device 130 with a phone, a POSITA would not have found Claim 10, or the claims depending from it, obvious.

2. 10[f]: “receive, via a user-manipulatable control, data indicative of a predetermined threshold level of charge by which the battery charger controller sends an alert, the predetermined threshold level of charge being less than a full charge of the battery;”

155. The Petition relies on the same Hobbs disclosures for the “predetermined threshold level of charge” limitation that it relied on for Claim 1[e][i-ii]. Pet., 76-77. But as explained with respect to that limitation, Hobbs does not teach that *the user* provides a level of charge, and does not teach that any user-provided input *triggers* the “substantially complete” alert. *Supra* Section VII.A.3. A POSITA would instead understand that the “substantially complete” alert in Hobbs is *automatically* set by the system and triggers when the charging current falls below a system-selected current threshold drawn from look-up table 272 based on battery type—not in response to any *user selection*. *Id.*

156. While the Petition also combines Sutardja with Hobbs for this claim limitation, it does so solely to argue that it would have been obvious for “the user [to] input[] a predetermined charge level *in terms of charge percentages* for the vehicle battery.” Pet., 77. But regardless of whether the purported user input in Hobbs is expressed as a “level of charge” of the battery or as “a particular amount of energy,” the “substantial completion” alert threshold—which the Petition relies on as the claimed “predetermined threshold”—is not one provided by the user. Changing the *units* in which a user expresses a charging input does not convert a system-selected alert threshold into a user-selected one. As such, this combination of prior art still does not teach this limitation.

157. The Petition’s effort to bridge that gap is, in my opinion, self-defeating. The Petition contends that “once the user inputs Sutardja’s desired charge amount (predetermined levels of charge), Hobbs would look up the associated current threshold to that charge amount” in look-up table 272. Pet., 78. But look-up table 272 is the very feature that makes the threshold a *system* selection rather than a user selection: Hobbs states that the current threshold “may be stored in look-up table 272 for the particular type battery pack or battery,” and that “*the threshold may be selected (e.g., by controller 270) based on the type of* battery pack or battery ... or based on the open-circuit voltage.” Ex. 1006 ¶ [0107]. Indeed, every charging parameter in Hobbs (Ex. 1006)—e.g., starting power level (¶ [0080]), voltage lid (¶

[0098]), current lid (§ [0102]), current threshold (§ [0107])—comes from table 272, which is keyed to battery type. Nothing in the charging profile is user-defined. The Petition thus relies on a controller-selected value to supply the threshold the claim requires be received “via a *user-manipulatable control*.”

158. Nor does look-up table 272 contain what the Petition needs it to contain. Hobbs teaches that table 272 “may be used to store information on various types of batteries that may be charged by charger 100” and “may be part of a battery classifier or system configured to identify the *type* of battery pack or battery ... being charged.” Ex. 1006 § [0052]. It is indexed by *battery type*, not by user-entered charge percentages, and Hobbs discloses no entry, field, or lookup path mapping a user’s selected percentage to a corresponding current value. The Petition’s “would look up the associated current threshold” step is therefore an assumed capability rather than a disclosed one, and neither the Petition nor Mr. Andrews explains how Hobbs’s charger would derive it or how a POSITA would implement it.

159. Moreover, the Petition does not explain why a POSITA would have had any reason to deliver charge-level alerts to diagnostic device 130 in the first place. Hobbs’s diagnostic device 130 exists to “diagnose faults within charger 100, program charger 100, provide additional charging information, etc.,” and is intended “to be used *by a technician* having more knowledge than a typical user of charger 100.” Ex. 1006 § [0037]. A service technician—or the company operating a public,

pay-per-use charger—has no need to be alerted that an individual customer’s battery has reached a particular charge level, and the Petition identifies nothing in Hobbs suggesting otherwise. The Petition’s theory thus requires the assumption both that a technician’s service tool is a consumer’s phone and that the charger would be redesigned to send that tool notifications it has no use for. In my opinion, that reasoning reflects hindsight rather than obviousness because neither assumption is supported.

3. 10[g]: “compare, during charging of the battery with the vehicular battery charger, a level of charge of the battery to the predetermined threshold level of charge; and”

160. The Petition relies on the same annotated version of Hobbs’ Figure 3 relied on for Claim 1[e][i-ii]. *Compare* Pet., 79 *with* Pet., 15. That figure does not establish that Hobbs’s “substantial completion” threshold is based on a user-input parameter, and therefore, this limitation is not obvious for the same reasons discussed regarding that limitation. *Supra* Section VII.A.3.

4. 10[h]: “responsive to detection of the level of charge of the battery reaching the predetermined threshold level of charge during the charging session and before charging of the battery is complete, send a signal indicative of the level of charge being reached via the transmitter to the controller of the phone as the alert”

161. For this limitation the Petition argues:

A POSITA would have been motivated and found it obvious to implement Kelty-078’s known text messaging cell phone alert functionality to transmit Hobbs’s alert as a signal to Hobbs’s phone so

that the driver of the vehicle would be notified when the charge was nearing completion. EX1003-Dec, ¶¶272-273. This would avoid the user being required to stay with their car during charging, and/or to check back repeatedly until the charging was complete. *Id.* A POSITA would have been motivated to make all the necessary modifications needed to be able to transmit messages. *Id.* It was well known that PDA phone devices (e.g., Treo) received texts. *Id.*

Pet., 81.

162. First, Hobbs’ diagnostic device 130 is not a “phone,” as explained with respect to Claim 10[d]. *Supra* Section XI.B.1.a.

163. Second, even if diagnostic device 130 did qualify as a phone, the Petition’s rationale for the combination is illogical. The Petition argues that it would have been obvious to send a text-message “alert” to Hobbs’ so-called phone (diagnostic device 130) “so that the ***driver of the vehicle*** would be notified when the charge was nearing completion.” But diagnostic device 130 belongs ***to the technician***, not to the driver. Ex. 1006 ¶ [0037] (device 130 is “to be used by a technician”). The purpose of the diagnostic device is to facilitate maintenance and diagnosis of faults; it is not logical to assume that the driver would possess it. And the Petition offers no explanation as to why a technician would need to know—or would care—whether a particular driver’s vehicle has reached a particular charge threshold.

164. In my opinion, this rationale illustrates a broader concern with the Petition: it appears to be constructed backward from the claims rather than forward from the prior art. The Petition asks that a technician's service tool be treated as the vehicle owner's phone, and alleges that a POSITA would have routed consumer charge-level alerts to it, solely because Claim 10 recites a phone that receives such an alert. This approach reflects hindsight reasoning because it is simply unsupported by the actual teachings of the prior art.

XII. OPINIONS ON GROUND 6

The Petition asserts that the combination of Hobbs, Sutardja, Kelty-078, and Kuromame renders obvious dependent claim 13 of the '107 Patent. Pet., 2. Because claim 13 depends from independent claim 10, which is patentable for the reasons discussed above, I have provided no opinions on this ground. However, I reserve the right to opine on this ground should the Board institute trial.

XIII. CONCLUSION

165. 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. I further declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Dated: September 23, 2026



Samuel Russ, PhD.

APPENDIX A

Curriculum Vitae of Dr. Samuel H. Russ

Personal

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Phone: (251) 461-1378
e-mail: sruss@southalabama.edu
Citizenship: U.S.

Education

Ph.D. in Electrical Engineering, Georgia Institute of Technology, 1991.
Thesis Title: *An Information-Theoretic Approach to Analysis of Computer Architectures and Compression of Instruction Memory Usage*
Thesis Advisor: Dr. Cecil O. Alford
Bachelor's of Electrical Engineering (with Highest Honor), Georgia Institute of Technology, 1986.

Employment

Aspect Aerospace

2023 – Present

Co-Founder and CTO: Pursue venture capital investments, work with potential customers, develop engineering plan for the company, write grant proposals, supervise patenting process. Write and obtain grant funding. Develop satellite architectures and products including power system and battery charging.

University of South Alabama

2007 – Present

Interim Chair, Department of Electrical and Computer Engineering (2015-2016)

Associate Professor, Department of Electrical and Computer Engineering (2011-present)

Assistant Professor, Department of Electrical and Computer Engineering

Developing new class in signal integrity, developing cross-disciplinary collaborative research efforts, updating labs and class materials, teaching both undergraduate and graduate classes. Pioneering coursework in embedded-system safety includes battery chemistries, chargers, and safety issues. Developed and launched a fully functional CubeSat satellite that included a power system with solar power and a battery charger, and optimized the software for minimal power consumption.

Scientific-Atlanta (Later Cisco, Now Technicolor)

2000 - 2007

Manager, Advanced Technologies R&D, Explored major new technologies including home networking and multi-room video distribution; oversaw construction of prototypes and demonstrations; demonstrated technologies at trade shows and to stock analysts; managed group of approximately 10 designing set-top boxes for the cable television industry including all phases of high-volume electronic design including layout, high-speed digital design, emissions considerations, gate array conversion, and designing with custom ASICs; supervised cross-functional team to increase hard drive reliability; wrote numerous patent applications. Products deployed widely, including Time Warner Cable and Cablevision.

IVI Checkmate (Now Ingenico)

1999 – 2000

Matrix Manager, Electrical Engineering, Supervised staff of approximately 6 electrical engineers, oversaw assignments, allocated time across multiple projects, worked to coordinate project schedules with priorities, assisted in sales and other customer communications.

Staff Electrical Engineer, Oversaw major design overhaul of touch-pad payment system including embedded-systems design, power-system design, battery-powered operation, optimization of charging including thermal issues, and system layout and schematic capture. System deployed widely at Wal-Mart, Home Depot, and others.

Mississippi State University

1994 - 1999

Thrust Leader, Computing Systems Research Thrust and Systems Integration Group, NSF Engineering Research Center -- Coordinate research plans and NSF reporting for 6 faculty and 3 full-time staff, assist in development of strategic plans and pursuit of funding opportunities, oversight of development of the ERC-wide integrated testbed. Managed multi-year research project in distributed computing that included 11 students and 5 faculty.

Assistant Professor, Department of Electrical & Computer Engineering -- Developed all-new graduate class in circuit board design, authored textbook chapter, developing new undergraduate lab, pioneered teaching classes over 2-way interactive video.

Dickerson Vision Technologies (Now Cognex)

1992 - 1994

Director of Manufacturing--Oversaw the development and implementation of a manufacturing plan for the company.

Senior Applications Engineer--Developed firmware and user-interface software for the company's proprietary hardware, Assisted in development of machine vision system hardware, Assisted in sales duties.

Georgia Institute of Technology

1987 - 1991

Graduate Research Assistant--Helped design five VLSI chips while developing two custom CPU's, Silicon-compiler-based computer chip design, including initial design, full functional simulation, size and timing optimization, and manufacturing test development.

Publications

Books

1. Samuel H. Russ, *Signal Integrity: Applied Electromagnetics and Professional Practice*, Springer, 2016. (Textbook)
2. Samuel H. Russ, *Signal Integrity: Applied Electromagnetics and Professional Practice*, Second Edition, Springer, 2022. (Textbook)

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1. Samuel H. Russ, "High-Speed Digital Effects", Chapter 10 of John Kraus and Daniel Fleisch, *Electromagnetics with Applications, Fifth Edition*, McGraw-Hill, 1998. (Textbook)
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2. Mink DM, McDonald J, Bagui S, Glisson WB, Shropshire J, Benton R, Russ S. Near-Real-Time IDS for the U.S. FAA's NextGen ADS-B. *Big Data and Cognitive Computing*. 2021; 5(2):27. <https://doi.org/10.3390/bdcc5020027>
3. S. H. Russ and J. Gatlin, "Ways to hack a printed circuit board: PCB production is an underappreciated vulnerability in the global supply chain," *IEEE Spectrum*, vol. 57, no. 9, pp. 38-43, Sept. 2020.
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6. Samuel H. Russ and Salim Alsharif, "Packet Loss Behavior of HomePlug AV Traffic at Video Bit Rates", *IEEE Transactions on Consumer Electronics*, Vol. 57, No. 2, May 2011, pp. 823-826.
7. Samuel H. Russ and Ramesh Nallur, "Digital Video Recording onto Solid-State Disks: Feasibility and Lifetime Estimation", *IEEE Transactions on Consumer Electronics*, Vol. 57, No. 2, May 2011, pp. 558-563.
8. Samuel H. Russ and Sasan Haghani, "802.11g Packet-Loss Behavior at High Sustained Bit Rates in the Home", *IEEE Transactions on Consumer Electronics*, Vol. 55, No. 2, May 2009, pp. 788-791.
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10. Ioana Banicescu, Sheikh Ghafoor, Vijay Velusamy, Samuel H. Russ, Mark Bilderback, "Experiences from integrating algorithmic and systemic load balancing strategies", *Concurrency and Computation: Practice and Experience*, Volume 13, Number 2, pp. 121-139 (2001).
11. Roger L. King, Samuel H. Russ, Aric B. Lambert, Donna S. Reese, "An artificial immune system model for intelligent agents", *Future Generation Computer Systems*, Volume 17, Issue 4, pp. 335 - 343 (January 2001).
12. Dr. Samuel H. Russ, Jonathan Robinson, Matt Gleeson, Brad Meyers, and Chun-Heong Tan, "Using Hector to Run MPI Programs over Networked Workstations", *Concurrency - Practice and Experience*, Vol. 11, No. 4, pp. 189-204 (1999).
13. Russ, S.H. Reece, K. Robinson, J. Meyers, B. Rajan, D. Rajagopalan, L. Chun-Heong Tan, "Hector: an agent based architecture for dynamic resource management", *IEEE Concurrency*, Vol. 7, No. 2, pp. 47-55, Apr-Jun 1999.
14. Dr. Samuel H. Russ, Jonathan Robinson, Dr. Brian K. Flachs, and Bjorn Heckel, "The Hector Distributed Run-Time Environment", *IEEE Transactions on Parallel and Distributed Systems*, Vol. 9, No. 11, pp. 1102-1114 (1998).
15. S.H. Russ and C.O. Alford, "Coupled Noise and Its Effects on Modern Packaging Technology", *IEEE Transactions on Components, Hybrids, and Manufacturing Technology*, Volume 13, Number 4, December 1990, pp. 1074-1082.

U.S. Patents

1. U.S. Patent Number 6,748,080, "Apparatus for entitling remote client devices", Samuel Russ, Michael Gaul, Anthony Wasilewski, and Howard Pinder, June 8, 2004.
2. U.S. Patent Number 7,181,010, "Apparatus for entitling remote client devices", Samuel Russ, Michael Gaul, Anthony Wasilewski, and Howard Pinder, February 20, 2007.
3. U.S. Patent Number 7,360,233, "Broadcast carousel system access for remote home communication terminal", Samuel Russ, Michael Gaul, and Anthony Wasilewski, April 15, 2008.
4. U.S. Patent Number 7,360,235, "Systems and methods for operating a peripheral record/playback device in a networked multimedia system", David Davies, Samuel Russ, and Irvan Krantzler, April 15, 2008.
5. U.S. Patent Number 7,499,822, "Analog set-top calibration patterns in manufacturing", Leo Montreuil, Wayne B. Williams, Samuel H. Russ, and Robert Kriete, March 3, 2009
6. U.S. Patent Number 7,505,592, "Apparatus for entitling and transmitting service instances to remote client devices", Samuel H. Russ, Michael Gaul, Anthony Wasilewski, and Howard Pinder, March 17, 2009
7. U.S. Patent Number 7,516,470, "Locally-updated interactive program guide", Samuel H. Russ and Michael Gaul, April 7, 2009
8. U.S. Patent Number 7,826,711, "Digital Video Disc (DVD) Player or Digital Video Recorder (DVR) Playback with Memory", Samuel H. Russ, Nov. 2, 2010.
9. U.S. Patent Number 7,849,486, "Networked subscriber television distribution", Samuel H. Russ, David Lett, Jonathan Robinson, and Michael Gaul, Dec. 7, 2010.

10. U.S. Patent Number 7,860,250, "Apparatus for entitling and transmitting service instances to remote client devices", Samuel H. Russ, Michael Gaul, Anthony Wasilewski, and Howard Pinder, Dec. 28, 2010.
11. U.S. Patent Number 7,861,272, "Networked subscriber television distribution", Samuel H. Russ, David Lett, Jonathan Robinson, and Michael Gaul, Dec. 28, 2010.
12. U.S. Patent Number 7,870,584, "Interactive program guide with selectable updating", Samuel H. Russ and Michael Gaul, Jan. 11, 2011.
13. U.S. Patent Number 7,876,998, "DVD playback over multi-room by copying to HDD", William Wall and Samuel H. Russ, Jan. 25, 2011.
14. U.S. Patent Number 7,908,625, "Networked multimedia system", Neil C. Robertson, David B. Lett, Samuel H. Russ, Bohdan S. Prus, Michael A. Gaul, and Ajith N. Nair, March 15, 2011.
15. U.S. Patent Number 7,937,737, "Field qualification of disk drives in consumer electronics devices", Samuel H. Russ and Mark R. Murray, May 3, 2011.
16. U.S. Patent Number 7,961,780, "Generated set top calibration patterns in manufacturing", Leo Montreuil, Wayne B. Williams, Samuel H. Russ, and Robert Kriete, Jun. 14, 2011.
17. U.S. Patent Number 7,978,720, "Digital media device having media content transfer capability", Samuel H. Russ, Christopher L. Stallings, July 12, 2011.
18. U.S. Patent Number 8,046,806, "Multiroom point of deployment module", William E. Wall, Samuel H. Russ, Oct. 25, 2011.
19. U.S. Patent Number 8,127,236, "Proximity detection using wireless connectivity in a communications system", Paul J. Claussen, Ajith N. Nair, and Samuel H. Russ, Feb. 28, 2012.
20. U.S. Patent Number 8,181,205, "PVR Channel and PVR IPG Information", Samuel H. Russ, Michael A. Gaul, and Dariusz S. Kaminski, May 15, 2012.
21. U.S. Patent Number 8,208,796, "Systems and methods for prioritizing the storage location of media data", Bohdan Prus and Samuel H. Russ, June 26, 2012.
22. U.S. Patent Number 8,280,229, "DVD playback over multi-room by copying to HDD", William E. Wall and Samuel H. Russ, October 2, 2012.
23. U.S. Patent Number 8,295,338, "Generated set top calibration patterns in manufacturing", Leo Montreuil, Wayne B. Williams, Samuel H. Russ, and Robert A. Kriete, October 23, 2012.
24. U.S. Patent Number 8,364,015, "Stretch and zoom bar for displaying information", Samuel H. Russ and Gary Hibbard, January 29, 2013.
25. U.S. Patent Number 8,549,567, "Media content sharing over a home network", Samuel H. Russ, David B. Lett, Jonathan Robinson, Michael A. Gaul, October 1, 2013.
26. U.S. Patent Number 8,627,385, "Systems and methods for operating a peripheral record playback device in a networked multimedia system", David B. Davies, Samuel H. Russ, Irvan J. Krantzler, January 7, 2014.
27. U.S. Patent Number 8,966,550, "Home communication systems," David B. Davies, Samuel H. Russ, Irvan J. Krantzler, February 24, 2015.
28. U.S. Patent Number 9,762,970, "Access of stored video from peer devices in a local network," David B. Davies, Samuel H. Russ, and Irvan J. Krantzler, September 12, 2017.
29. U.S. Patent Number 10,412,439, "PVR Channel and PVR IPG Information", Samuel H. Russ, Michael A. Gaul, and Dariusz S. Kaminski, Sep. 10, 2019.

European Patents

1. European Patent Number EP1543680B1, "Locally-updated interactive program guide", Samuel Russ and Michael Gaul, Feb. 17, 2010.
2. European Patent Number EP1673937B1, "Proximity detection using wireless connectivity in a communications system", Paul Claussen, Ajith Nair, and Samuel Russ, April 21, 2010.
3. European Patent Number EP1604523B1, "Method for determining the encryption of a service content depending on the fidelity of the reformatting of said content", Samuel Russ, Michael Gaul, Anthony Wasilewski, and Howard Pinder, Nov. 21, 2012.

4. European Patent Number EP1552699B1, "Networked multimedia system", Neil Robertson, David Lett, Samuel Russ, Bohdan Prus, Michael Gaul, and Ajith Nair, Dec. 18, 2013.
5. European Patent Number EP1334617B1, "Networked Subscriber Television Distribution", Samuel Russ, David Lett, Jonathan Robinson, and Michael Gaul, April 1, 2015.
6. European Patent Number EP1920601B1, "Multiroom Point of Deployment Module," William Wall and Samuel Russ, May 4, 2016.
7. European Patent Number EP1510033B1, "Apparatus for Entitling Remote Client Devices," Samuel H. Russ, Michael Gaul, Anthony Wasilewski, and Howard Pinder, April 26, 2017.
8. European Patent Number EP1540946B1, "Broadcast Carousel System Access for Remote Home Communications Terminal via a Gateway Device," Samuel Russ, Michael Gaul, and Anthony Wasilewski, April 18, 2018.
9. European Patent Number EP2008280B1, "Method and Device for Prioritizing the Storage Location of Media Data," Bohdan Prus and Samuel Russ, September 26, 2018.

Conference Papers

1. J. E. S. Dalgety and S. Russ, "Design, Implementation, and Verification of a DC-Powered Solar Cell Test Bench," *SoutheastCon 2025*, Concord, NC, USA, 2025, pp. 1328-132
2. McDonald, Jeffrey Todd, Jennifer Parnell, Todd R. Andel, and Samuel H. Russ. "Effectiveness of Adversarial Component Recovery in Protected Netlist Circuit Designs." In *SECURITY*, pp. 181-192. 2022.
3. S.H. Russ, M. Khan, S. Latif, "Surreptitiously Adding a WLAN Antenna to a Printed Circuit Board" 2022 IEEE Physical Assurance and Inspection of Electronics (PAINE), Huntsville, AL, USA, 2022.
4. J. Todd McDonald, Rebecca C. Clark, Lee M. Hively, and Samuel H. Russ. 2022. "Phase space power analysis for PC-based rootkit detection." In *Proceedings of the 2022 ACM Southeast Conference (ACM SE '22)*. Association for Computing Machinery, New York, NY, USA, 82–90. <https://doi.org/10.1145/3476883.3520212>
5. S. H. Russ, "Surreptitiously Adding a Microcontroller to a Printed Circuit Board," 2021 IEEE Physical Assurance and Inspection of Electronics (PAINE), Washington, DC, USA, 2021.
6. S.H. Russ, "Circuit Board Security Vulnerabilities and Counteractions", IPC APEX EXPO 2021.
7. S. H. Russ, "Techniques to Thwart Surreptitiously Altered PCBs," 2020 IEEE Physical Assurance and Inspection of Electronics (PAINE), Washington, DC, USA, 2020, pp. 1-4.
8. S. H. Russ, E. Spencer, T. Scroggins, and S. Latif, "Power-Efficient Software Architecture for a CubeSat System", *2020 SoutheastCon*, Raleigh, NC, USA, 2020, pp. 1-6.
9. A. Russ, S. H. Russ, E. Spencer and M. Frank, "Motor Controller and Reaction Wheel for CubeSat," *2019 SoutheastCon*, Huntsville, AL, USA, 2019, pp. 1-3.
10. F. Lorenzo, J. T. McDonald, T. R. Andel, W. B. Glisson and S. Russ, "Evaluating Side Channel Resilience in iPhone 5c Unlock Scenarios," *2019 SoutheastCon*, Huntsville, AL, USA, 2019, pp. 1-7
11. E. Spencer, D. Clark, S. Russ, *et al.*, "First results from a time domain impedance probe for measuring plasma properties in the ionosphere," 2017 IEEE 60th International Midwest Symposium on Circuits and Systems (MWSCAS), Boston, MA, 2017, pp. 1284-1287.
12. E. Spencer, D. Clark, R. Gollapalli, S. Russ and B. Kerrigan, "A System On Chip design for fast time domain impedance spectroscopy," 2017 IEEE 60th International Midwest Symposium on Circuits and Systems (MWSCAS), Boston, MA, 2017, pp. 124-127.
13. Ramya Manikyam, J. Todd McDonald, William R. Mahoney, Todd R. Andel, and Samuel H. Russ, "Comparing the effectiveness of commercial obfuscators against MATE attacks," *Proceedings of the 6th Workshop on Software Security, Protection, and Reverse Engineering (SSPREW '16)*, 2016, Article 8. DOI: <https://doi.org/10.1145/3015135.3015143>
14. Samuel Russ, Tho Ha, and Jonathan Shapiro, "Simulation of Digital Video Recording to

- Maximize Solid-State Disk Lifetime,” *Proceedings of the 2014 International Conference on Consumer Electronics*, Jan. 10-13, 2014, pp. 562-563.
15. Thomas Thomas, Cade Cashen, and Samuel Russ, “Leveraging Smart Grid Technology for Home Health Care”, *Proceedings of the 2013 International Conference on Consumer Electronics*, Jan. 11-14, 2013, pp. 276-277.
 16. Cade Cashen, Samuel Russ, and Thomas Thomas, “Using a Wireless LAN to Perform Motion Detection”, *Proceedings of the 2013 International Conference on Consumer Electronics*, Jan. 11-14, 2013, pp. 63-64.
 17. Nicklaus Thomas, David Evans, and Samuel Russ, “A Markovian Algorithm for Creating Immersive Public-Speaking Audiences”, *Proceedings of the 2013 International Conference on Consumer Electronics*, Jan. 11-14, 2013, pp. 384-385.
 18. Samuel H. Russ, “Podcasting to Improve Software Usage”, *Proceedings of the 2012 ASEE Southeastern Section Conference*, April 1-3 2012, Starkville, MS, Paper ID 605.
 19. Samuel H. Russ, “Using Student ID Numbers to Create Customized Homework Problems”, *Proceedings of the 2012 ASEE Southeastern Section Conference*, April 1-3 2012, Starkville, MS, Paper ID 606.
 20. Samuel H. Russ and Ramesh Nallur, “Digital Video Recording Onto Solid-State Disks”, *2011 Digest of Technical Papers, 2011 International Conference on Consumer Electronics*, pp. 495-496. (2nd place in best paper contest, 2011.)
 21. Mohammad Mushtaq, Samuel H. Russ, and Mohammad S. Alam, “Variable FEC to Reduce ECC Overhead in Digital Video Transmission”, *2011 Digest of Technical Papers, 2011 International Conference on Consumer Electronics*, pp. 215-216.
 22. Samuel H. Russ and Salim Alsharif, “Behavior of HomePlug AV Traffic At High Sustained Bit Rates in the Home”, *2011 Digest of Technical Papers, 2011 International Conference on Consumer Electronics*, pp. 682-683.
 23. Samuel H. Russ, Viswakalyan Perepa, Silas Leavesly, and Bret Webb, “Novel Low-Cost Salinity Sensor for Embedded Environmental Monitoring”, *Proceedings of IEEE Southeastcon 2010*, March 18-21, 2010, pp. 53-56.
 24. Samuel H. Russ and Kung-Hsien Chen, “Thermally Conductive Circuit Boards”, *Proceedings of the 59th Electronic Components and Technology Conference (ECTC 2009)*, May 2009, pp. 465-468.
 25. Samuel H. Russ and Sasan Haghani, “Behavior of 802.11g Traffic at High Sustained Bit Rates in the Home”, *2009 Digest of Technical Papers, 2009 International Conference on Consumer Electronics, Jan. 2009*, pp. 423-424.
 26. Samuel H. Russ, and Ramesh Nallur, “A Framework for Calculating Fundamental DVR Performance Limits”, *2009 Digest of Technical Papers, 2009 International Conference on Consumer Electronics, Jan. 2009*, pp. 51-52.
 27. Samuel H. Russ, “Home Networking: Extending Cable’s Reach”, *The Complete Technical Paper Proceedings from NCTA*, 2001, pp. 160-165.
 28. Samuel H. Russ, Rashid Jean-Baptiste, Tangirala Shailendra Krishna Kumar, and Marion G. Harmon, “Transparent Real-Time Monitoring in MPI”, *IPPS/SPDP Workshops 1999*, in *Parallel and Distributed Processing*, Lecture Notes in Computer Science, vol. 1586, Springer-Verlag, 1999, pp. 1327-1334.
 29. Roger L. King, Aric B. Lambert, Samuel H. Russ, and Donna S. Reese, “The Biological Basis of the Immune System as a Model for Intelligent Agents”, *IPPS/SPDP Workshops 1999*, in *Parallel and Distributed Processing*, Lecture Notes in Computer Science, vol. 1586, Springer-Verlag, 1999, pp. 156-164.
 30. Aric Lambert, Roger King, Sam Russ, and Donna Reese, “Intelligent Control Agents for Resource Management of Heterogeneous Parallel Computing”, *Computational Intelligence for*

Modeling, Control, and Automation (CIMCA 98) in Concurrent Systems Series, vol. 55, IOS Press, 1999, pp. 116-121.

31. Samuel H. Russ and Adam Gaither, “Developing An Integrated Environment for Computational Field Simulation”, *Object-Oriented Methods for Inter-Operable Scientific and Engineering Computing: Proceedings of the 1998 SIAM Workshop*, pp. 50-57.
32. Samuel H. Russ, Ioana Banicescu, Sheikh Ghafoor, Bharathi Janapareddi, Jonathan Robinson, and Rong Lu, “Hectiling: An Integration of Fine and Coarse-Grained Load-Balancing Strategies”, *Proceedings of the Seventh International Symposium on High Performance Distributed Computing*, August 1998, IEEE Computer Society, pp. 106-113.
33. Samuel H. Russ, “An Architecture for Rapid Distributed Fault Tolerance”, 3rd International Workshop on Embedded High-Performance Computing, in J. Rolim, Editor, *Parallel and Distributed Processing*, Lecture Notes in Computer Science, vol. 1388, Springer-Verlag, 1998, pp. 925-930.
34. Dr. Samuel H. Russ, Brad Meyers, Jonathan Robinson, Matt Gleeson, Laxman Rajagopalan, Chun-Heong Tan, and Bjørn Heckel, “User-Transparent Run-Time Performance Optimization”, *Proceedings of the 2nd International Workshop on Embedded HPC Systems and Applications*, Geneva, April 1997.
35. J. Robinson, S.H. Russ, B. Flachs, and B. Heckel, “A Task Migration Implementation of the Message-Passing Interface”, *Proceedings of the 5th High Performance Distributed Computing Conference (HPDC-5)*, August 1996, IEEE Computer Society, pp. 61-68.
36. S.H. Russ, B. Flachs, J. Robinson, and B. Heckel, “Hector: Automated Task Allocation for MPI”, *Proceedings of the 10th International Parallel Processing Symposium*, April, 1996, IEEE Computer Society, pp. 344-348.
37. W.S. Tan, C.O. Alford, and S.H. Russ, “GT-EP: A Novel High-Performance Real-Time Architecture”, *Proceedings of the 18th International Symposium on Computer Architecture*, May 1991, pp. 12-21.

Reports

1. Aric B. Lambert, Roger L. King, Samuel H. Russ, Donna S. Reese, “Adaptive Analysis for the Design of Hardware Agents Using the Artificial Immune System Model for Resource Management of Heterogeneous Systems”, Miss. State Technical Report No. MSSU-COE-ERC-98-10, Aug. 1998.
2. Daniel H. Linder, Robert B. Reese, Jon Robinson, and Samuel H. Russ, “JavaCADD: A Java-based Server and GUI for Providing Distributed ECAD Services”, Mississippi State University Technical Report No. MSSU-COE-ERC-98-07, May 1998.
3. Samuel H. Russ, “Using Hector in an Architecture for Rapid Distributed Fault Tolerance”, Mississippi State Technical Report No. MSSU-EIRS-ERC-97-17, December 1997.
4. Samuel H. Russ, Jonathan Robinson, Matt Gleeson, and Jose Figueroa, “Dynamic Communication Mechanism Switching in Hector”, Mississippi State Technical Report No. MSSU-EIRS-ERC-97-8, September 1997.
5. Samuel H. Russ, Brian Flachs, Jonathan Robinson, and Bjorn Heckel, “Hector: Automated Task Allocation for MPI”, Mississippi State Technical Report No. MSSU-EIRS-ERC-95-6, September, 1995.

Funded Grants and Contracts

University of South Alabama

1. National Space Grant Foundation, Aug. 2018-May 2019, “Automation Infrastructure for Gateway Biological Laboratory,” PI, \$28,062.
2. Nfina (Local Mobile Company), March 2018 – March 2019, “Redhawk”, PI, \$119,881.

3. NASA, May 2016 – Present, “Spatially Resolved Measurements Of Plasma Density Irregularities In The Ionosphere F Region For Scintillation Studies”, Co-I, \$100,000.
4. Marine Environmental Science Consortium (GRI), Jan. 2011-Dec. 2011, “Conductivity Based In-Situ Hydrocarbon Sensor”, PI, \$9,338.
5. University of South Alabama Research Council (USARC), Feb. 2008 – Feb. 2009, “Instrumentation of Hurricane Forecast Models for Performance Optimization”, \$5,000 for one year.

Mississippi State University

1. National Science Foundation, April 1998-March 1999, “An ERC-CREST Partnership in Distributed and Computational Systems”, PI, \$100,000/year, renewable for 5 years.
2. Office of Naval Research, Nov. 1996-Nov. 1998, “Distributed Visualization and Virtual Environments for Oceanography and Meteorology”, Co-PI, \$200,000.
3. U.S. Army Waterways Experiment Station, July 1996-July 1999, “Efficient Parallel Wave Modeling”, PI, \$200,000, Funded under CHSSI (Common HPC Scalable Software Initiative) of the DoD. (\$50,000 actually funded.)
4. NSF Engineering Research Center for Computational Field Simulation, April 1995- May 1999, “Heterogeneous Computing Testbed (CA 8)”, PI, By year: \$34,983/\$70,111/\$55,916. Funded through NSF Engineering Research Center.

Dickerson Vision Technology

1. Small Business Innovations Research Program of the NSF, Division of Industrial Interface, September 1993 - February 1994, Award No. III-9260914. (\$50,000 Phase I contract conducted at Dickerson Vision Technologies.)

Technology Transfer and Licensing

Hector Distributed Run-Time Environment licensed by MPI Software Technology, Inc., Starkville, MS in June 1998 (while at Mississippi State University)

Students Advised (Major Professor)

Level	At USA	At MSU
Ph.D.	--	0
Masters	3	9

Courses Created and Enhanced

University of South Alabama

EE 264 Microprocessor Systems and Interfacing – Replaced 68HC11 with Freescale 9S12 architecture and redesigned the entire course, Introduced use of 68HC11 simulator and accompanying podcast to enhance student’s ability to visualize microprocessor operation

EE 268 Digital Logic Design Lab – Updated one lab experiment

EE 368 Microprocessor Systems Lab – Developed all-new sequence to tie EE 368 to senior projects with hands-on experiments like motors, photocells, and servomotors.

EE 401 Introduction to ECE Design – Completely overhauled the first-semester senior project course. Added lectures on professionalism, career development, and legal aspects of engineering. Structured the course so that reports would lead up to their senior-project reports.

EE 404 ECE Design – Completely overhauled the second-semester senior project course by requiring better projects and adding material on giving effective presentations. Obtained very enthusiastic response from the department’s Industrial Advisory Board.

EE 446 – Obtained donation of boards from Freescale and redesigned all of the experiments to develop more interesting demonstrations and to switch from assembly language to C.

EE 457/557 – Developing series of podcasts to augment in-class lectures with materials related to embedded systems and professional development.

EE 469/569 Advanced Digital System Design – Developed all-new course in high-speed circuit board design from an electromagnetics perspective, and authored a textbook for the course. Added a lab experience in 2009.

EE 560 Advanced Computer Architecture – Selected new textbook for the class and developed lecture materials to match

EG 101 – Developed systematic curriculum shared by all sections including “checklists” for instructors, handouts, and lecture materials. Introduced motors project, which has become the most popular EG 101 project.

Mississippi State University

EE 8993 High Speed Digital Design -- Offered on video nationwide, it features pioneering treatment of high-speed circuit board design from an electromagnetics perspective. Material from the class has been included in one of the best-known electromagnetics textbooks, and it continues to be one of the most popular graduate classes in the department.

EE 4743 Computer Aided Digital Design -- Added breakthrough educational technology to permit remote access to logic synthesis capabilities. Offered on live two-way video starting Fall 1998.

Courses Taught

University of South Alabama

EE 220, Circuit Analysis I, 1 course.

EE 263, Digital Logic Design, 2 courses.

EE 264, Microprocessor Sys-Interfacing, 4 courses.

EE 268, Digital Logic Design Lab, 1 course.

EE 368, Microprocessor Sys Interf Lab, 14 courses.

EE 401, Intro Elec and CpE Design - W, 7 courses.

EE 404, Elec and Comp Eng Designs-W, 7 courses.

EE 440, HDL Logic Synthesis, 1 course.

EE 446, Embedded System Design Lab, 2 courses.

EE 457, Embedded System Design, 10 courses.

EE 469, Signal Integrity, 5 courses.

EE 534, VLSI Design Systems, 1 course.

EE 540, HDL Logic Synthesis, 1 course.

EE 548, Computer-Network Security, 5 courses.

EE 557, Adv. Embedded System Design, 8 courses.

EE 560, Adv Computer Architecture, 3 courses.

EE 569, Signal Integrity, 5 courses.

EG 101, Intro to Engineering & Design, 5 courses.

EG 231, Intro to Ethics and Economics, 2 courses.

Mississippi State University

Number Description

EE 2111 Electrical Lab I

Class Description

Accompanies introductory digital class

EE 2713 Digital Devices
 EE 4723 Microcomputers II
 EE 4743 Computer Aided Digital Design
 EE 8993 High-Speed Digital Design

Introductory digital class
 Microcontroller interfacing
 VHDL, logic design, and synthesis
 Signal integrity and high-speed design

Honors and Awards

University of South Alabama College of Engineering “Teacher of the Year” 2015

Mobile Area Council on Engineering “Engineering Educator of the Year” 2015

Technology and Engineering Emmy® Award, 2012, for “Pioneering Development of Multi-Room DVR.” Awarded to Cisco. I managed the groups that built the first prototypes, gave public demonstrations, wrote numerous patent applications, and developed the first mass-production set-top containing Multi-Room DVR.

2nd Place in “Best Paper – Storage Category” at ICCE 2011. The paper is “Digital Video Recording Onto Solid-State Disks” as noted in Conference publications above.

Attendee, “Top Prof” Banquet – University of South Alabama chapter of Mortar Board, 2009,2010

Tau Beta Pi Engineering Professor of the Year – University of South Alabama chapter of Tau Beta Pi, 2008. One of two highest awards in the College of Engineering for teaching, and the only award voted on by honor students in the College.

Finalist, 53rd International Science and Engineering Fair, 1983, Albuquerque, NM.

Professional Activities

Expert Witness Engagements

Case	Jurisdiction and Case Number	Year(s)	Witness for	Expert Reports	Dep.	Trial	IPR* Rep.
WNE Holdings v. Rockwell Automat.	Southern District of Alabama	2011	Plaintiff	1	0	0	0
Personalized Media Corp. (PMC) v. Echostar	Eastern District of Texas	2010-2015	Plaintiff	2	3	0	0
Pegasus v. DirecTV et al.	Delaware	2011-13	Plaintiff	1	0	0	0
Apple v. Samsung	Int’l Trade Commission 337-TA-796	2012	Respondent	4	1	1	0
EON v. MobiTV et al.	Delaware	2013	Defendant	1	1	0	0
PMC v. Zynga	Eastern District of Texas	2013	Plaintiff	1	5	0	4
OpenTV v. Netflix	Delaware	2014	Defendant	0	0	0	0
Kaplan v. OnForce	N.D. California	2014	Defendant	0	0	0	1
Intellectual Ventures v. J.P. Morgan Chase	Southern District of New York	2013-2019	Defendant	2	2	0	0
PMC v. Amazon	Delaware	2014-2015	Plaintiff	1	9	0	5
Better Mouse Corp. v. Steelseries et al.	Eastern District of Texas	2015-2016	Plaintiff	2	0	1	0

Case	Jurisdiction and Case Number	Year(s)	Witness for	Expert Reports	Dep.	Trial	IPR* Rep.
SyncPoint v. Nintendo et al.	Eastern District of Texas	2015	Plaintiff	2	1	0	0
TQ Beta v. Dish	USPTO (IPR)	2016	Defendant	1	1	0	0
Script v. ADT et al.	Eastern District of Texas	2016	Plaintiff	2	2	0	0
Sony v. Pace	USPTO (IPR)	2016	Defendant	0	1	0	4
PMC v. Apple	EDTX and USPTO (IPR)	2016-2021	Patent Owner	2	1	1	2
PMC v. Samsung	Eastern District of Texas	2016	Patent Owner	2	0	0	0
Music Choice v. Stingray	Eastern District of Texas	2016-2019	Plaintiff	2	2	0	4
Broadcom v. AMD	USPTO (IPR)	2016	Petitioner	0	0	0	1
Tech Pharmacy v. Alixa et al.	Eastern District of Texas	2017	Plaintiff	2	2	1	0
Rovi v. PMC	Eastern District of Texas, Arbitration	2017	Defendant	0	1	0	0
Implicit v. Trend Micro	Eastern District of Texas	2017	Defendant	2	1	0	0
Implicit v. Palo Alto	Eastern District of Texas	2018	Defendant	1	1	0	0
Invensas v. Samsung	Eastern District of Texas	2018	Plaintiff	2	1	0	0
Selective Signals v. Palo Alto	USPTO (IPR)	2018	Petitioner	0	1	0	1
Rovi Tivo v. Various	Canada	2018	Plaintiff	0	0	0	0
Implicit v. Netscout	Eastern District of Texas	2018	Defendant	0	0	0	0
Rovi Tivo v. Comcast	USPTO (IPR)	2019-2020	Plaintiff	0	4	0	5
Rovi Tivo v. Comcast	ITC	2019-2020	Petitioner	2	1	1	0
BBitv v. OpenTV	California	2019	Defendant	0	0	0	0
Roku v UEI	USPTO (IPR)	2019-Now	Petitioner	0	6	0	8
MV3 v Roku	Western District of Texas	2019-2020	Defendant	2	2	1	0
BBitv v Dish	USPTO (IPR)	2019-2020	Petitioner	0	3	0	6
PMC v Google	Eastern District of Texas	2020	Plaintiff	1	1	0	0
PMC v Netflix	Southern District of New York	2020	Plaintiff	2	0	0	0
UEI v Roku <i>et al.</i>	ITC	2020-2021	Respondent	1	1	1	0
BBitv v Dish	Western District of	2020-	Defendant	1	5	0	6

Case	Jurisdiction and Case Number	Year(s)	Witness for	Expert Reports	Dep.	Trial	IPR* Rep.
	Texas	2021					
Flexiworld v Amazon <i>et al.</i>	Western District of Texas	2020-Now	Defendant	0	0	0	0
Flexiworld v Roku	Western District of Texas	2021-2022	Defendant	2	0	0	0
Roku v UEI <i>et al.</i>	ITC	2021-2022	Complain.	1	0	1	0
Roku v DivX	USPTO (IPR)	2021	Petitioner	0	0	0	1
Apple v Identity	USPTO (IPR), Ex Parte Re-Exam, Western District of Texas	2022-2024	Patent Owner	2	1	1	6
Audi v Aprese	USPTO (IPR)	2022	Petitioner	0	0	0	2
paSafeShare	Ex Parte Re-Exam, Western District of Texas	2021-Now	Patent Owner, Plaintiff	1	0	0	3
PerfectVision v PPC Broadband	USPTO (IPR)	2022-Now	Petitioner	0	0	0	1
Google v Nobots	USPTO (IPR)	2022	Patent Owner	0	2	0	4
Fall Line v Various	Eastern District of Texas	2022-Now	Plaintiff	6	2	1	0
Assa Abloy v CPC	USPTO (IPR)	2023-2024	Patent Owner	0	2	0	4
IOENGINE v Roku	Western District of Texas	2023-2024	Defendant	5	2	1	0
Gratuity v Toast	USPTO (IPR)	2023-2024	Petitioner	0	1	0	1
Lexos v Ebay	USPTO (IPR)	2024	Patent Owner	0	1	0	1
Entropic v Various	USPTO (IPR) Eastern District of Texas	2024-Now	Patent Owner / Plaintiff	3	6	0	7
Roku v Anonymous	USPTO (IPR)	2024	Petitioner	0	0	0	6
Adeia v Videotron	Fed. Court of Canada	2024-2025	Plaintiff	2	0	1	0
AMD v Concurrent	USPTO (IPR)	2024-Now	Petitioner	1	0	0	0
TrueSight v Samsung	Eastern District of Texas	2025	Defendant	2	1	0	0
Sandpiper v Various	USPTO (IPR)	2025-Now	Patent Owner	0	0	0	1
Mood v Eglä	USPTO (EPR)	2026	Petitioner	0	0	0	1

* Includes reports submitted for IPRs, CBMRs, and Re-Exams

Invited Lectures

“Real-time Monitoring in MPI”, Florida A&M University, Tallahassee, FL, August 1998

Consulting

Consulted with various investment firms concerning telecommunications market, 2007 – 2011.
Cox Communications – DVR Reliability – 2015

Society Memberships

Institute of Electrical and Electronic Engineers (Senior Member), IEEE Consumer Electronics Society, IEEE Computer Society, Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi, Gamma Beta Phi
Secretary, Northeast Mississippi Subsection of the IEEE, 1994-95

Article Reviewer

Computers and Electrical Engineering, Supercomputing '94, IEE Transactions, Concurrency: Practice and Experience, International Parallel Processing Symposium, IEEE Transactions on Education, IEEE Transactions on Parallel and Distributed Systems, ICT 2012, ICAEE 2012

Proposal Reviewer

Army Research Office, National Science Foundation, U.S. Department of Energy

University Service

Chair, Search Committee, ECE Department – Search for Assistant Professor positions, 2008-now (chair since 2011)

Member, ECE Department Undergraduate Affairs Committee, 2015-now

Member, College of Engineering Academic Standards Committee, 2016-now

Member, Search Committee, College of Engineering – Search for 2 Associate Dean positions, 2015

Member, Search Committee, College of Engineering – Search for Associate Dean positions, 2008-09

Member, University of South Alabama Council on International Education, 2008-15

Chairman, ECE Department “Open House” Committee, 2008-09

Conducted open house and other demonstrations for the department, 2008-now

Chairman, ECE Department Recruiting and Retention Committee, 2007-08

Updated and conducted experiment for ACE program, 2007

Member, Hearin Undergraduate Committee, 1998

Department Coordinator, United Way Campaign, 1995

Award Referee, 1995 Instructional Paper Award, MSU College of Engineering