UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

GRAPHITE CHARGING COMPANY, LLC,
Patent Owner

Case No. IPR2024-00387
U.S. Patent No. 8,103,391

PATENT OWNER'S UNOPPOSED MOTION TO ACCEPT LATE FILING OF PATENT OWNER'S RESPONSE UNDER 37 C.F.R. § 42.5(c)(3)

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
Submitted Electronically via PTAB E2E

Pursuant to 37 C.F.R. § 42.5(c)(3) and as authorized by the Board in an email from November 13, 2024, Patent Owner Graphite Charging Company, LLC ("Graphite" or "PO"; together with Petitioner, the "parties") moves the Board to accept late submission of Patent Owner's Response ("Response") and Exhibits 2005, 2006 and 2007. Counsel for the parties conferred via e-mail, and Petitioner does not oppose this motion.

Under 37 C.F.R. § 42.5(c)(3), "[a] late action will be excused on a showing of good cause or upon a Board decision that consideration on the merits would be in the interests of justice." Here, both good cause and the interests of justice support excusing PO's late filing.

First, good cause exists here because PO was unable to meet the November 8, 2024 deadline (*see* Paper 21 at 2) due to technical difficulties beyond its control. Specifically, Nadiia Loizides, an attorney at Devlin Law Firm who was responsible for filing the Response, experienced a complete power outage at her residence shortly before 11 P.M. EST on the filing date. (Ex. A, ¶ 4.) Ms. Loizides contacted Leland Marcus, another associate who had been assisting her with the Response, but he was unable to finalize the filing because he was experiencing service delays with the Devlin Law Firm's remote desktop service and SharePoint document service of a severity that rendered those services unusable. (*Id*. ¶ 6; Ex. B, ¶¶ 4-5.) The power outage affecting Ms. Loizides's residence lasted

approximately 20 minutes and caused the finalizing and filing of the Response to be delayed. (Ex. A ¶ 8.) PO's counsel informed Petitioner's counsel by email before midnight on November 8, 2024 that it was having technical difficulties with the filing and asked whether Petitioner would oppose having the Board accept the filing as timely if filed after midnight. (Ex. D.) Ultimately, the technical difficulties faced by PO made it impossible to file the Response and Exhibits 2005 through 2007 on time. (Ex. A ¶ 9.)

When PO attempted to file the documents at about 12:15 A.M. EST, the P-TACTS system was down and prevented PO from completing the filing. (Ex. C, ¶¶ 3-4.) After learning that the P-TACTS system was down, PO's counsel immediately served copies of the Response and Exhibits 2005 through 2007 on Petitioner's counsel at 12:27 A.M. EST on November 9, 2024 (Ex. E), and apprised the Board via email of the situation at 1:05 A.M. EST on November 9, 2024 (Ex. F).

Although regrettable, this delay was due to technical difficulties beyond PO's control and does not reflect an oversight or lack of diligence. Therefore, good cause exists to grant PO's motion to accept late filing of its Response and Exhibits 2005 through 2007.

Second, excusing the late filing would also be in the interests of justice. The late filing would not prevent the Board from issuing a final written decision in this

inter partes review proceeding within the prescribed one-year deadline. Also, Petitioner suffered no prejudice from the delay because it was served Response and Exhibits 2005 through 2007 at 12:27 A.M. EST on November 9, 2024—twenty-seven minutes after the deadline. In contrast, PO would suffer great prejudice if its late filing is not excused because that would effectively render PO unable to present its defense. Indeed, a just resolution of this proceeding can be obtained only if the Board excuses the delayed filing of the Response. *See, e.g.*, *Corelogic, Inc. v. Boundary Solutions, Inc.*, IPR2015-00219, Paper 32 at *3 (Oct. 27, 2015) (excusing a one-day delay in filing the POR because it caused "essentially no prejudice Petitioner[,]" while striking the POR would cause "severe prejudice" to PO); *Taylor Made Golf Co., Inc. v. Parsons Xtreme Golf, LLC*, IPR2018-00675, Paper 19 at * 4 (PTAB Aug. 30, 2018) ("[I]t would be in the interests of justice to consider Patent Owner's Preliminary Responses and supporting exhibits in our decisions on institution. Institution decisions that consider Patent Owner's arguments will benefit both parties by providing clarity as to the Board's view of the evidence and arguments."); *see also Samsung Electronics Co., Ltd. v. Headwater Research LLC*, IPR2023-01462, Paper 8 at *2 (PTAB Jan. 16, 2024) (excusing one-day late POPR filing as in the interests of justice where the patent owner was unable to file in P-TACTS due to administrative oversight concerning power of attorney that was not discovered until the evening of the due date).

Submitted herewith are

(1) Declaration of Nadiia Loizides (attached as Exhibit A);

(2) Declaration of Leland Marcus (attached as Exhibit B);

(3) Declaration of Feng Xu (attached as Exhibit C);

(4) a copy of the email to the opposing counsel from November 8, 2024 informing them of PO's technical difficulties in filing the Response (attached as Exhibit D);

(5) a copy of the service email sent to opposing counsel at 1:27 A.M. EST on November 9, 2024, enclosing PO's Response and Exhibits 2005 through 2007 (attached as Exhibit E); and

(6) a copy of an email from PO's counsel to the Board sent at 1:05 A.M. EST on November 9, 2024 (attached as Exhibit F).

For these reasons, PO respectfully requests that this motion be granted.

Respectfully submitted,

Dated: November 15, 2024

/*Jason Shapiro*/

Jason Shapiro (Reg. No. 35,354)
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Devlin Law Firm LLC
1526 Gilpin Ave.
Wilmington, DE 19806

Telephone: (302) 449-9010

Counsel for Patent Owner
Graphite Charging Company, LLC

CERTIFICATE OF SERVICE
UNDER 37 C.F.R. § 42.6(e)(4)

The undersigned hereby certifies that a copy of the foregoing Patent Owner's Unopposed Motion to Accept Late Filing of Patent Owner's Response Under 37 C.F.R. § 42.5(c)(3) was served on November 15, 2024 by filing this document through the Patent Trial and Appeal Board End to End System as well as delivering a copy via electronic mail upon the following email addresses for the attorneys of record for the Petitioner: Tesla-Graphite391-IPR@morganlewis.com and pmargulies@tesla.com.

Dated: November 15, 2024

/Jason Shapiro/
Jason Shapiro

EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner

v.

GRAPHITE CHARGING COMPANY LLC,

Patent Owner

IPR2024-00387
U.S. Patent No. 8,103,391

AFFIDAVIT OF MS. NADIIA LOIZIDES IN SUPPORT OF PATENT OWER'S UNOPPOSED MOTION TO ACCEPT LATE FILING OF PATENT OWNER'S RESPONSE UNDER 37 C.F.R. § 42.5(c)(3)

I, Nadiia Loizides, recognizing that willfully false misstatements subject me to the penalty of perjury, hereby attest to the following:

1. I am an attorney at Devlin Law Firm LLC. I make this declaration in support of Patent Owner's Unopposed Motion to Accept Late Filing of Patent Owner's Response filed concurrently.

2. I was an attorney responsible for finalizing and filing the Patent Owner's Response and Exhibits 2005 through 2007 in the above-captioned IPR proceeding.

3. Patent Owner was unable to meet the November 8, 2024 deadline due to technical difficulties beyond its control.

4. Specifically, I experienced a complete power outage at my residence in Wilmington, DE shortly before 11 P.M. EST on the filing date.

5. I immediately informed my electric company, Delmarva Power, of the power outage, and they confirmed that no power was being supplied to my residence.

6. I also promptly contacted another associate who had been assisting me with the Response, but he informed me that he was unable to finalize the filing because he was experiencing service delays with the Devlin Law Firm's remote desktop service and SharePoint document service of a severity that rendered those services unusable.

7. Concurrently, I contacted my supervising attorney at Devlin Law Firm.

8. The power outage affecting my residence lasted approximately 20 minutes and caused the finalizing and filing of the Response and Exhibits 2005 through 2007 to be delayed.

9. Due to the delay, Patent Owner was unable to complete the filing by the deadline on November 8, 2024.

I declare under the penalty of perjury that all statements made in this Declaration are true and correct.

Executed on November 15, 2024 in Wilmington, Delaware.

/ Nadiia Loizides /
Nadiia Loizides
(admitted *pro hac vice*)
Devlin Law Firm LLC
1526 Gilpin Avenue
Wilmington, Delaware 19806
Tel: (302) 449-9010
Fax: (302) 353-4251
nloizides@devlinlawfirm.com

EXHIBIT B

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner

v.

GRAPHITE CHARGING COMPANY LLC,

Patent Owner

IPR2024-00387
U.S. Patent No. 8,103,391

AFFIDAVIT OF MR. LELAND R. MARCUS IN SUPPORT OF PATENT OWER'S UNOPPOSED MOTION TO ACCEPT LATE FILING OF PATENT OWNER'S RESPONSE UNDER 37 C.F.R. § 42.5(c)(3)

I, Leland R. Marcus, recognizing that willful false misstatements subject me to the penalty of perjury, hereby attest to the following:

1. I am an attorney at Devlin Law Firm LLC. I make this declaration in support of Patent Owner's Unopposed Motion to Accept Late Filing of Patent Owner's Response filed concurrently.

2. I was an attorney supporting the finalizing and filing of Patent Owner's Response and Exhibits 2005 through 2007 in the above-captioned IPR proceeding.

3. Patent Owner was unable to meet the November 8, 2024 deadline due to technical difficulties beyond its control.

4. Specifically, I experienced service delays during the evening of November 8, 2024 from about 9 p.m. to midnight E.T. in using both the Devlin Law Firm's remote desktop service and SharePoint document service. These service delays were of a severity to render the services unusable.

5. Thus, I did not have the technical capability to finalize the Patent Owner's Response and Exhibits 2005 through 2007 with the USPTO when my colleague, Ms. Nadiia Loizides, experienced a power outage.

6. Due to the delay, Patent Owner was unable to complete the filing by the deadline on November 8, 2024.

I declare under the penalty of perjury that all statements made in this Declaration are true and correct.

Executed on November 15, 2024 in Hurst, Texas.

/ Leland R. Marcus /

Leland R. Marcus
(Registration No. 81,814)
Devlin Law Firm LLC
1526 Gilpin Avenue
Wilmington, Delaware 19806
Tel: (302) 449-9010
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EXHIBIT C

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner

v.

GRAPHITE CHARGING COMPANY LLC,

Patent Owner

IPR2024-00387
U.S. Patent No. 8,103,391

AFFIDAVIT OF MS. FENG XU IN SUPPORT OF PATENT OWER'S UNOPPOSED MOTION TO ACCEPT LATE FILING OF PATENT OWNER'S RESPONSE UNDER 37 C.F.R. § 42.5(c)(3)

I, Feng Xu, recognizing that willfully false misstatements subject me to the penalty of perjury, hereby attest to the following:

1. I am a paralegal at Devlin Law Firm LLC. I make this declaration in support of Patent Owner's Unopposed Motion to Accept Late Filing of Patent Owner's Response filed concurrently.

2. I was the paralegal responsible for filing the Patent Owner's Response and Exhibits 2005 through 2007 in the above-captioned IPR proceeding.

3. When I attempted to file the documents at about 12:15 A.M. EST on November 9, 2024, the P-TACTS system was down and prevented Patent Owner from completing the filing.

4. I continued trying for another half hour, but the P-TACTS system did not come back online.

I declare under the penalty of perjury that all statements made in this Declaration are true and correct.

Executed on November 15, 2024 in Philadelphia, PA.

/ Feng Xu /
Feng Xu (Paralegal)

EXHIBIT D

Feng Xu

From: Jason Shapiro
Sent: Friday, November 8, 2024 11:52 PM
To: Stein, Alexander B.
Cc: 'pmargulies@tesla.com'; Michael Siem; Cedric Tan; Nadiia Loizides; DLF- Lit Paras; Tesla-Graphite391-IPR
Subject: RE: IPR2024-00387 Deposition of Dr. MacCarley

Hi Alex,

We're having technical difficulties filing the Patent Owner Response and exhibits. If we are unable to file them by midnight, we will email the filing to the Board and copy you.

Please let us know if Petitioner will oppose our request to have the Board accept the filing as timely.

Thanks,
Jason

DEVLIN LAW FIRM LLC
INTELLECTUAL PROPERTY LAW

Jason M Shapiro
1526 Gilpin Ave, Wilmington, DE 19806
(302) 449-9010 | (302) 473-3422
Admitted in DC and MD
Not Admitted in DE

From: Stein, Alexander B. <alexander.stein@morganlewis.com>
Sent: Monday, November 4, 2024 6:14 PM
To: Jason Shapiro <jshapiro@devlinlawfirm.com>
Cc: 'pmargulies@tesla.com' <pmargulies@tesla.com>; Michael Siem <msiem@devlinlawfirm.com>; Cedric Tan <ctan@devlinlawfirm.com>; Nadiia Loizides <nloizides@devlinlawfirm.com>; DLF- Lit Paras <dlflitparas@devlinlawfirm.com>; Tesla-Graphite391-IPR <Tesla-Graphite391-IPR@morganlewis.com>
Subject: RE: IPR2024-00387 Deposition of Dr. MacCarley

Hi Jason,

This looks fine – please proceed.

Best,

-Alex

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EXHIBIT E

Feng Xu

From: Feng Xu
Sent: Saturday, November 9, 2024 12:26 AM
To: Tesla-Graphite391-IPR@morganlewis.com; pmargulies@tesla.com
Cc: Nadiia Loizides; Jason Shapiro; Leland Marcus; DLF- Lit Paras
Subject: IPR2024-00387 - Patent Owner's Response
Attachments: EX 2007__CArthurMacCarley_COND.pdf; 2024-11-08 IPR2024-00387 Patent Owner's Response.pdf; EX 2006__Kirk Cameron CV.pdf; EX 2005 2024-11-08 Cameron Declaration.pdf

Counsel,

Please see attached for Patent Owner's Response and the exhibits.

Regards,

DEVLIN LAW FIRM LLC
INTELLECTUAL PROPERTY LAW

Feng Xu
1526 Gilpin Ave, Wilmington, DE 19806
(302) 449-9013

UNITED STATES PATENT AND TRADEMARK OFFICE

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Case No. IPR2024-00387
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PATENT OWNER'S RESPONSE

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Submitted Electronically via PTAB E2E

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TABLE OF EXHIBITS

Exhibit	Description
2001	Docket Report from May 9, 2024, *Graphite Charging Company LLC v. Tesla, Inc*., Case No. 5:24-cv-2717 (N.D. Ca.)
2002	Order Setting Initial Case Management Conference and ADR Deadlines, *Graphite Charging Co. LLC v. Tesla, Inc.*, Case No. 3:24-cv-02717-VC (N.D. Ca. May 7, 2024)
2003	Affidavit of Ms. Nadiia Loizides in Support of PO's Motion for *Pro Hac Vice* Admission
2004	Joint Stipulation and Order Regarding Stay Pending Resolution of Petitions for *Inter Partes* Review and Mandamus as Amended, *Graphite Charging Co. LLC v. Tesla, Inc.*, Case No. 3:24-cv-02717-VC (N.D. Ca. May 31, 2024)
2005	Declaration of Kirk Cameron in Support of Patent Owner
2006	Curriculum Vitae of Kirk W. Cameron, Ph.D.
2007	Deposition of C. Arthur MacCarley, IPR 2024-00387 (Oct. 17, 2024)

I. INTRODUCTION

The present proceeding was instituted without any claim terms being explicitly construed. Institution Decision (Paper 15), 8-9. When properly construed, however, it is abundantly clear that claims 1-20 ("the challenged claims") of U.S. Patent No. 8,103,391 ('the '391 patent") are patentable over the cited art because none of the cited art (alone or in the combinations proposed by Petitioner) discloses the challenged claims. As such, the Board should find Petitioner has not shown by a preponderance of evidence that claims 1-20 of the '391 patent are unpatentable.

II. APPLICABLE LEGAL PRINCIPLES

The petitioner has the burden to clearly set forth the basis for its challenges in the petition. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (stressing the particularity requirement in 35 U.S.C. § 312(a)(3)). The petitioner may not rely on the Board to substitute its own reasoning to remedy the deficiencies in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018); *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1381 (Fed. Cir. 2016).

To the extent that the petition relies on an expert declaration, it must be more than conclusory and disclose the facts underlying the opinion. *See* 37 C.F.R. § 42.65(a); *Edmund Optics, Inc. v. Semrock, Inc.*, IPR2014-00583, Paper 50 at 8 (PTAB Sept. 9, 2015) (affording little or no weight to "experts' testimony [that]

does little more than repeat, without citation to additional evidence, the conclusory arguments of their respective counsel"). Nor may the petition rely on the expert declaration to remedy gaps in the petition itself. 37 C.F.R. § 42.6(a)(3); *Cisco Sys. v. C-Cation Techs.*, IPR2014-00454, Paper 12 at 9 (PTAB Aug. 29, 2014) ("This practice of citing the Declaration to support conclusory statements that are not otherwise supported in the Petition also amounts to incorporation by reference.").

To prove anticipation under 35 U.S.C. § 102, the petitioner must show that each and every claim element is found in a single reference and arranged as in the claim. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987); *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). Further, the prior art reference "must . . . disclose the claimed [invention] or direct those skilled in the art to the [invention] without *any* need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference." *Net MoneyIN*, 545 F.3d at 1372 (emphasis original).[1]

To prove obviousness under 35 U.S.C. § 103, the Petition must, among other requirements, fulfill the requirements set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), including showing that the cited references, in combination, disclose

[1] Unless specified otherwise, all emphasis is added in this Brief.

each element of a challenged claim. *See Magnum*, 829 F.3d at 1376; *Apple Inc. v. Contentguard Holds.*, IPR2015-00442, Paper 9 at 12-13 (PTAB July 13, 2015).

Petitioners also have the burden to show motivation to combine the asserted prior art, and that the proposed combination would render the patented claims obvious. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011); *Magnum*, 829 F.3d at 1376. Even if individual modifications or choices were obvious, a petition must explain why making all of the changes at once would be obvious. *Apple*, IPR2015-00442, Paper 9 at 16-17 ("[T]he mere fact that individual changes might have been obvious does not make doing all of the changes at once obvious.").

The lack of a technological obstacle to combining references, in and of itself, does not justify a finding of obviousness. *See In re Omeprazole Patent Litig. v. Apotex Corp.*, 536 F.3d 1361, 1380-81 (Fed. Cir. 2008). A reason for combining disparate prior art references is critical and should be made explicit. *InTouch Techs., Inc. v. VGo Communs., Inc.*, 751 F.3d 1327, 1351 (Fed. Cir. 2014).

Hindsight analysis is inappropriate; obviousness must be measured "*at the time the invention was made*." *Ortho-McNeil Pharm. v. Mylan Labs*, 520 F.3d 1358, 1364 (Fed. Cir. 2008) (emphasis original). The petition must demonstrate a rationale to combine prior art references without relying on the patent disclosure itself. *Apple*, IPR2015-00442, Paper 9 at 15, 17; *see also P&G v. Teva Pharms.*

USA, Inc., 566 F.3d 989, 995 (Fed. Cir. 2009). The petitioner must not use the patent as a roadmap. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007); *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011).

III. OVERVIEW OF THE '391 PATENT

The '391 Patent, entitled "System for Detecting Interrupt Conditions During an Electric Vehicle Charging Process," has a priority date of August 19, 2008, and relates to a data processing system and method for managing a charging process of an electric vehicle (EV). (EX-1001 at 1:8-11.)

EVs contain electric storage mechanisms, such as batteries, that store electricity for when power is needed. (*Id*. at 1:27-29.) In order for an EV to continue operating, the storage mechanism requires charging to replenish the depleted electric charge. (*Id*. at 1:29-31.) One way to provide charging is through an "off-vehicle" charging station that provides an external source of electricity. *Id*. at 1:40-44).

At the time, EV manufacturers and electric utility companies had only planned and provided infrastructure for the most rudimentary charging scenarios, such as merely plugging the electric vehicle into a common electric outlet that was owned by the owner and operator of the electric vehicle. (*Id*. at 6:60-65.) However, the inventors recognized that EV charging would frequently be conducted under much broader and more complex sets of circumstances, such as might occur when

charging an EV at an off-vehicle charging station owned by somebody other than the vehicle owner, and under such circumstances the charging transactions by which EVs obtained electricity from such an off-vehicle charging station "requires a much more complete, flexible, and interoperable system governing all aspects of the charging transaction." (*Id*. at 6:65 - 7:16.)

The inventors divided the charging transaction into three aspects or phases: the pre-charge phase, the charge phase, and the post-charge phase. (*Id*. at 7:17 - 7:19.) In the pre-charge phase, "all parties are presented with conditions governing the charging transaction." (*Id*. at 7:19 - 7:21.) In the charge phase, "[e]lectricity flows to the EV and payment is made." (*Id*. at 7:21-22[2].). Additionally, during the charge phase, one or more operational parameters that conform to predefined interrupt conditions are monitored and, if one or more interrupt conditions are identified, then the charging process is terminated. (*Id*. at 10:8-12, 14:1-5).

Interruptions may include a device capability interruption, a preference interruption, or a data services interruption. (*Id*. at 11:12-17.) Device capabilities interruptions originate from component of the electric vehicle energy transaction

---

[2] While the specification says "post-charge" phase here, a POSITA would understand from the context, and other parts of the specification (*e.g.*, Ex. 1001 at 8:60-9:32), that the inventors meant "charge" phase.

infrastructure, (*Id*. at 13:10-20), preference interruptions are caused by violation of a user-specified preference, (*Id.* at 13:21-36), and data services interruptions are caused by the inability for information to be exchanged with third-party data services sources, (*Id.* at 13:37-46, 8:38-44). Additionally, a user may terminate the charging process by generating a manual override interruption, which is an instruction generated by the user with a user interface. (*Id*. at 12:24-36.) In the post-charge phase, "an analysis is performed to provide incentives and induce specific behaviors on the part of any party involved in the transaction." (*Id*. at 7:22-25.)

Figure 3 of the '391 Patent (reproduced below) shows an embodiment of an electric vehicle energy transaction infrastructure for managing all phases of the charging transaction—i.e., the pre-charge phase, the charge phase, and the post-charge phase. (*Id*. at 7:30-34.) Components of the electric vehicle energy transaction infrastructure, such as the energy transaction execution engine (or "ETEE"), the energy transaction interrupt monitor (or "ETIM"), and the integration and service bus (which allows components of the data processing system to communicate and transfer data), may be implemented on a data processing system. (*Id*. at 7:34-40, 9:61-64.) The data processing system may be a network data processing system (e.g., as depicted in Figure 1 of the '391 Patent) with one or more servers and one or more clients connected to a network (such as

the Internet), (*Id*. at 4:3-23, 5:1-15), or the data processing system may be a computer, such as a server or client depicted in Figure 1 of the ’391 Patent, (*Id*. at 5:16-24). Operations of the energy transaction interrupt monitor are illustrated in the flowcharts shown in Figures 6 and 7. (*Id*. at 13:47-51, 14:17-21.) Each block or combination of blocks in the flowcharts can be implemented by computer program instructions (i.e., program code). (*Id*. at 3:33-37.) A data processing system suitable for storing and/or executing program code will include at least one processor coupled to memory elements through a system bus. (*Id*. at 16:13-16.)

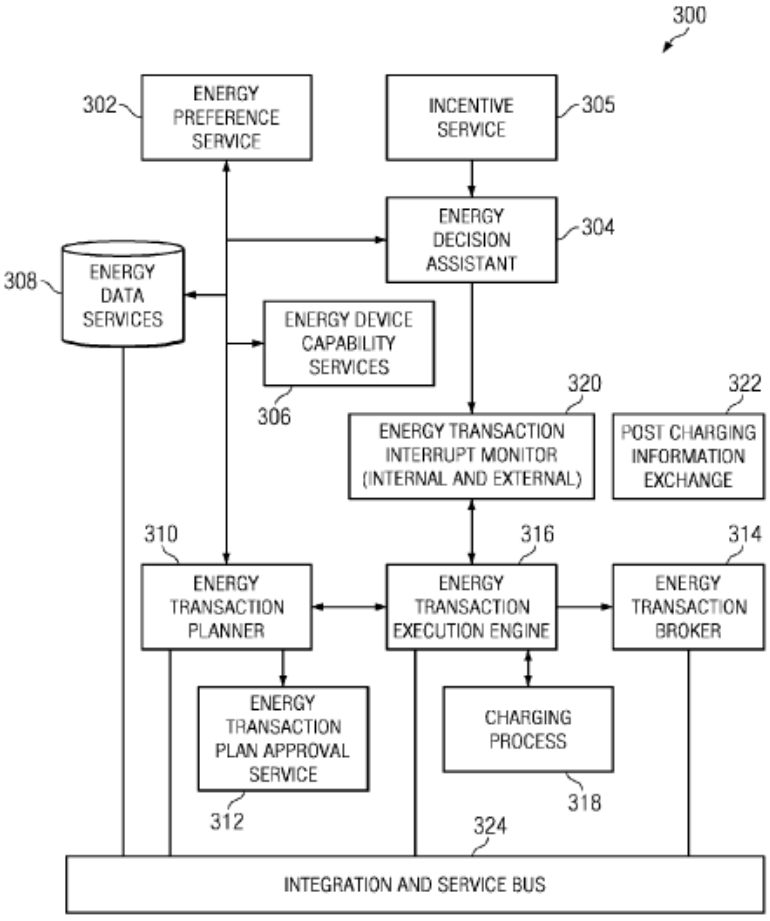


FIG. 3

If one of more of the components are located remotely, they may transfer data using a wired network connection or a wireless network connection such as a cell-phone network, satellite, two-way radio, WiFi networks, or any other type of wireless network. (*Id*. at 10:1-7.)

Components of an illustrative data processing system are shown in Figure 4 of the ’391 patent (reproduced below). (*Id*. at 10:51-54.) Data processing system 400 includes transaction interrupt monitor 402 that monitors a charging process 404 for interruptions 406 after receiving a request to start monitoring a charging process. (*Id*. at 10:51-11:9; 13:52-53; Figure 6.) As noted previously, interruptions 406 may include a device capability interruption, a preference interruption, or a data services interruption, or any combination thereof. (*Id*. at 10:35-40.) Energy transaction interrupt monitor 402 identifies interruptions 406 from operational parameters 408 by identifying the operational parameters from operational parameters 408 that conform to predefined interrupt conditions 412. (*Id*. at 11:39-44.) If an interruption is identified, then the process sends a response to the energy transaction execution engine to terminate the charging process. (*Id*. at 14:1-5).

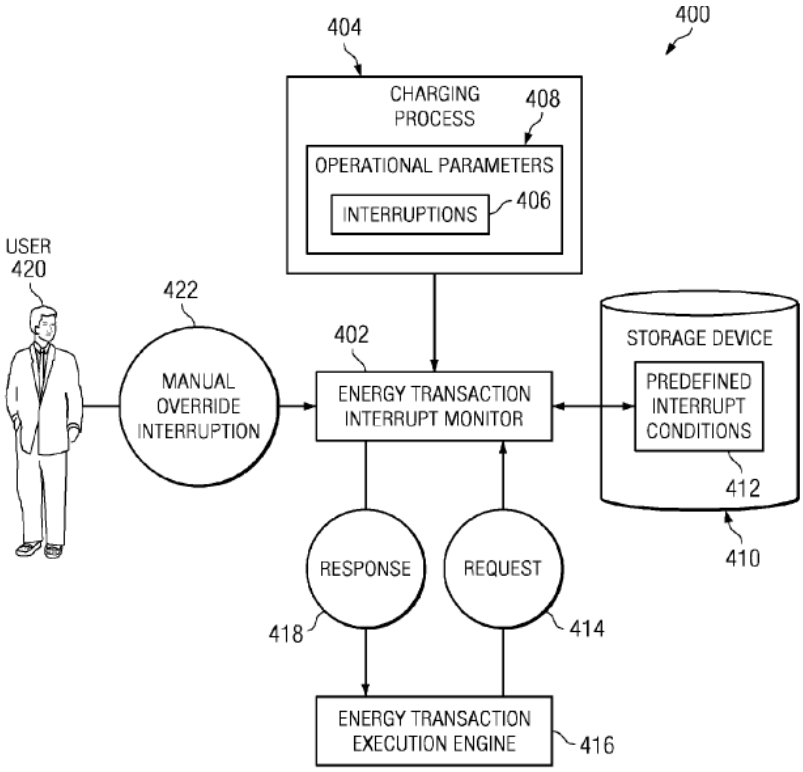


FIG. 4

Figure 6 of the ’391 Patent (reproduced below) is a flowchart showing a process for managing a charging process of an EV according to an illustrative embodiment. (*Id*. at 13:47-49.)

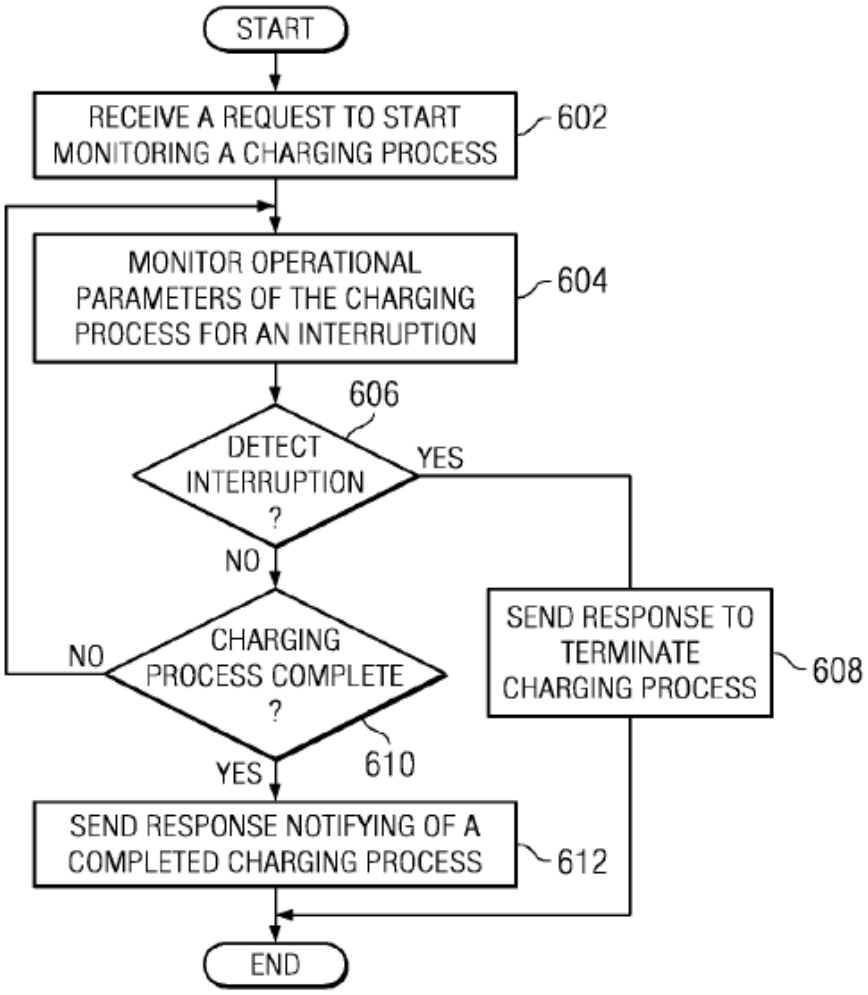


FIG. 6

As noted previously, when a request to start monitoring a charging process is received, operational parameters of the charging process are monitored for an interruption. If an interrupt condition is detected, the process sends a response to terminate the charging process. For example, if pricing for energy were to exceed a predefined threshold in violation of a user-selected preference, the monitor detects this interrupt condition and initiates appropriate actions to terminate the electric power flow to the electric vehicle. (*Id*. at 9:15-20.) Alternatively, power could be

supplied to the grid during times of high prices from stored energy within the vehicle. (*Id*. at 4:48-57.) Furthermore, termination of the charging process because of detecting interruptions may insure that the charging process proceeds according to the terms and conditions that were established by parties to the charging process. (*Id*. at 14:62-65.)

IV. PERSON ON ORDINARY SKILL IN THE ART

The Board concluded in the Institution Decision ("ID") that a POSITA:

> would have had a bachelor's degree in computer science or electrical engineering, along with at least two to three years of experience working on software and/or hardware used to manage charging processes for electric vehicles. Additional advanced educational degrees could substitute for some years of industry experience and vice versa.

(ID at 17.)

The Board also declined Petitioner's proposal that a POSITA should be familiar with relevant standards and regulations (including J1772). (*Id*. at 17; Pet. at 6.)

PO submits that the above definition of a POSITA is too narrow. While PO agrees that a POSITA would have had a bachelor's degree in computer science or electrical engineering, along with at least two to three years of experience, and also agrees that additional education could substitute for professional experience and vice versa, PO disagrees that the experience need be limited to working on software

and/or hardware used to manage charging processes for electric vehicles. Since the '391 Patent is focused on data processing concepts such as execution engines, interrupt monitors, and data services for managing an energy transaction, at least two to three years of experience working on data processing systems in the field of energy management would have been sufficient. PO's position is supported by the '391 Patent, which describes the invention as being "related generally to an improved data processing system, and in particular, to a method and apparatus for managing electric vehicle charging transactions." (EX1001 at 1:8-11 (emphasis added); see also 2:38-48, 3:62-65 (referring to data processing environments in which embodiments may be implemented); 5:16-18 (referring to a data processing system in which illustrative embodiments may be implemented). Indeed, the '391 Patent makes it clear that the invention is not directed to electric vehicles or charging stations themselves. (Id. at 4:24-26, 37-39.)

For similar reasons, PO agrees with the Board that a POSITA would not require knowledge of standards and regulations relevant to charging of electrical vehicles (including J1772, EX-1011). PO's position is further reinforced by the fact that standards and regulations such as J1772 are not mentioned anywhere in the '391 patent.

Thus, PO submits that a POSITA would have had a bachelor's degree in computer science or electrical engineering, along with at least two to three years of

experience working on data processing systems in the field of energy management, with additional education substituting for professional experience and vice versa.

V. CLAIM CONSTRUCTION

Claims in a post-grant review are construed using the same claim construction standard as in a civil action. 37 C.F.R. § 42.100(b). Under this standard, claims terms are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art ("POSITA") at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (*en banc*). The POSITA is deemed to read the claim term in the context of the entire patent, including the specification and prosecution history. *Id. at* 1313-1316. Courts depart from the plain and ordinary meaning in only two instances: (1) when a patentee acts as its own lexicographer, and (2) when the patentee disavows the full scope of the claim term in the specification or during prosecution. *Hill-Rom Servs. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014).

Petitioner's claim that it "applied plain and ordinary meanings to all terms" (Pet. at 6), without specifying what constitutes the plain and ordinary meaning of any term, is not helpful in resolving the controversy at hand.

For example, the Petition fails to specify what constitutes the plain and ordinary meaning of "data services interruption," "preference interruption," and "manual override interruption," which are relevant to Petitioner's anticipation and

obviousness arguments. The Petition also ignores the explicit definitions provided for these terms in the specification, which are relevant to Patent Owner's position that the Petition fails to show the challenged claims are unpatentable.

A. "Data Services Interruption"

The patentees acted as their own lexicographers in defining the term "data services interruption" recited in claims 1, 6, 8, 13, 15, and 20 of the '391 patent. (*E.g.*, Ex. 1001 at 16:56.) Specifically, the patentees disclosed in the specification that a data services interruption:

> ***is a set of one or more interruptions caused by the inability for information to be exchanged with data services sources***. Data service sources are sources of data, such as, for example, energy data services 308 in FIG. 3. Data services interruption 506 may be caused by power outages, broken transmission lines, or any other problems preventing a data service from exchanging information with other components of an electric vehicle transaction infrastructure.

(Ex. 1001 at 13:38-46 (emphasis added).)[3] Further, the specification stresses that:

> Energy data services 308 are a set of one or more ***third party data sources*** providing information relevant to the energy transaction. Energy data services 308 may include, without limitation, weather information sources, traffic information sources, map and travel information sources, charging station price information sources, or any other third party information sources.

(*Id.* at 8: 38-44.)

[3] Unless specified otherwise, all emphasis is added throughout this Brief.

Accordingly, the term "data services interruption" should be construed as "a set of one or more interruptions caused by the inability for information to be exchanged with a set of one or more third party data sources providing information relevant to the energy transaction," where the term "third party" means "an entity or person that is not a party to the electric vehicle charging transaction." (*See id.* 7:41-47.) Examples of data sources include, without limitation, weather information sources, traffic information sources, map and travel information sources, charging station price information sources, or any other third party information sources. (*Id.* at 8: 40-44.)

By defining the term "data services interruption" in this way, the inventors disavowed claims covering intra-system communications abnormalities, such as communication failures between the battery and the charging station. (*See* Pet. at 28.) Petitioner's expert Dr. MacCarley failed to consider the definition in the '391 patent and instead devised his own (wrong) definitions—

- "the plain and ordinary interpretation of that would be some disruption of normal data ***communication from one entity to another or to multiple other targets***." (Ex. 2007 at 34:21-25.)
- "There is a data services interruption, which would be monitoring the operational parameter—the operational state of data communication either between the ***two units, the execution engine and the interrupt monitor***, or external infrastructure events. They allow in the text." (*Id.* at 27:23–28:4.)
- "broader class of data services interruption" (*id.* at 70:5-6.)

Dr. MacCarley's definitions are wrong because it is he—and not the '391 patent—who considers data services interruptions a "broader class" encompassing "***multiple*** . . . targets." And the relevant communication cannot be between the ETEE and ETIM because both are intra-system units and not third-party data sources. Accordingly, Dr. MacCarley's testimony on this term should be given no weight.

PO's proposed construction is also consistent with the Detailed Description of the Invention of the '391Patent, in which Data services interruption is described in terms of interruptions of third party communications. (Ex. 1001 at 13:42-43; *see also, e.g.*, *id.* at 8:40-44, 2:5-14, 10:35-38, 10:51–11:17, 13:37-46, 14:41-56; *id.* figs. 4-7.) (Ex. 2005, ¶¶ 74-78.) (Ex. 2005, ¶¶ 69-73.)

B. "Manual Override Interruption"

The patentees acted as their own lexicographers in defining the term "manual override interruption" recited in claims 2, 9, and 16 of the '391 patent. The specification discloses that:

> Manual override interruption 422 is ***an instruction*** that causes energy transaction execution engine 416 to terminate charging process 404. User 420 may generate manual override interruption 422 by interacting with a user interface located at the charging station or on the electric vehicle. In addition, user 420 may generate manual override interruption 422 at a remote location by implanting a user interface presented on a remote computing device. For example, user 420 may utilize a cell phone or computer for accessing a user interface for generating manual override interruption 422.

(Ex. 1001 at 12:26-36.) "User 420 may terminate charging process 404 by generating manual override interruption 422." (*Id.* at 12: 24-26.)

The specification also discloses in Figure 7 that a received manual override notification may be identified as an interruption (steps 72 and 704):

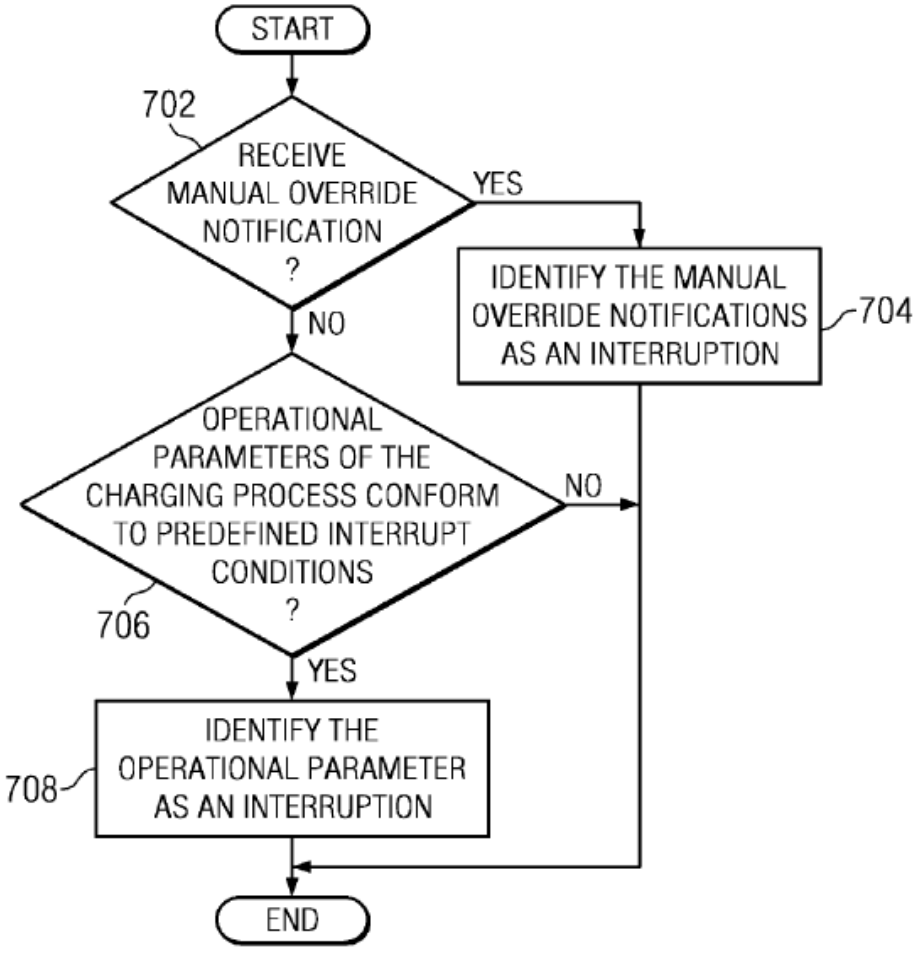


FIG. 7

(*Id.* fig.7.)

PO's expert Dr. Cameron opined that a POSITA would understand "instruction" as that term is used in the '391 patent to mean an encoding of a series

of operational steps specifying the details to be executed according to those operational steps. Thus, an instruction is a digital operation capable of sending a complex series of signals and goes beyond the simple mechanical operation of pressing a button on a keyboard to complete a circuit.

Accordingly, the term "manual override interruption" should be construed as "an instruction that causes energy transaction execution engine to terminate the charging process, which a user may generate during the flow of electricity by interacting with a user interface," where "instruction" means "an encoding of a series of operational steps specifying the details to be executed according to those operational steps."

By defining the term in this way, the patentees disavowed claims covering mere opening and closing of a switch. Dr. MacCarley's opinions on construction of the "manual override interruption" should be given no weight because he defined it as "a human being or ***some external, decision-making entity*** providing an input to the system that would lead to the interruption, the termination, of the charging process." (Ex. 2007 at 43:11-16.) His definition is inappropriately broad, and should be accorded little weight, because it does not require generating an instruction and conflates input from an external decision-making entity with user-generated input.

On the other hand, PO's proposed construction is consistent with the Detailed Description of the Invention of the '391 patent. For example, in one embodiment, a manual override interruption is generated using a user interface of a cell phone or computer. (Ex. 1001 at 12:26-45; *id.* figs. 4-7.) (Ex. 2005, ¶¶ 74-78.)

C. "Preference Interruption"

The patentees acted as their own lexicographers in defining the term "preference interruption" recited in claims 1, 5, 8, 12, 15, and 20 of the '391 patent. The specification discloses that:

> Preferences interruption 504 is a set of one or more interruptions that are caused from a violation of a ***user-specified*** preference. The user-specified preference may be, for example, a preference specified by an owner or operator of an electric vehicle or a utility provider. Thus, a user may specify a preference for a threshold cost for charging an electric vehicle. If the cost of charging the electric vehicle during a charging process exceeds the user cost preference, then an energy transaction interrupt monitor identifies the cost as preference interruption 504. Other parties may also specify preferences, the violation of which results in identification of preference interruption 504. Preferences for the user or third parties may be set in an energy transaction plan or stored in a data storage device accessible to the energy transaction interrupt monitor.

(Ex. 1001 at 13:22-36.) Accordingly, the term "preference interruption" should be construed as "a set of one or more interruptions that are caused from a violation of a user-specified preference."

By defining the term "preference interruption" in this way, the inventors

disavowed claims covering, among other things, factory presets, which are not user-specified. (*See* Pet. at 27; Ex. 1001 at 6:62–7:2.) Petitioner's expert Dr. MacCarley failed to consider the definition in the '391 patent and instead devised his own (wrong) definitions—

> There is a preference interruption, which is somewhat broadly defined ***as an externally settable parameter*** either by the user or ***by some external parameter setting input*** that has been violated or is altered or for whatever other reason needs to be monitored and could potentially indicate that termination of charging is appropriate.

(Ex. 2007 at 28:9-16.)

> [T]o answer your question, preference interruption would be a ***violation of either some threshold or some state***, both of those being compared with an operational parameter input that, if that difference occurs—if, say, a threshold is exceeded or a state is violated, put into something other than what was preferred when the preference was set up, that would constitute an event worthy of generating an interruption of charging.

(*Id.* at 33:17–34:3.) Dr. MacCarley's definition is wrong, and should be accorded little weight, at least because it is too broad in that it covers factory presets, which are not user-specified, and is not limited to violations of the preference.

PO's proposed construction is also consistent with the Detailed Description of the Invention of the '391 patent, which explains that in one exemplary embodiment,

> a user may specify a preference for a threshold cost for charging an electric vehicle. If the cost of charging the electric Vehicle during a charging process *exceeds* the user cost preference, then an energy

> transaction interrupt monitor identifies the cost as preference interruption 504.

(Ex. 1001 at 13:28-31; *see also, e.g.*, *id.* at 2:5-14, 10:51–11:17, 13:21-36, 14:41-56; *id*. figs. 4-7.) (Ex. 2005, ¶¶ 79-81.)

VI. THE PETITION FAILS TO SHOW BY A PREPONDERANCE OF EVIDENCE THAT ANY OF THE CHALLENGED CLAIMS ARE INVALID

A. Ground 1: Kimura Does Not Render Claims 1, 4-8, 11-15, or 18-20 Obvious

1. Claim 1[4]

Claim 1 recites, in relevant parts of elements 1[a] and 1[d], respectively, "responsive to receiving, from an energy transaction execution engine, ***a request signaling a start*** of the charging process . . . ," and "responsive to detecting the one or more interruptions, sending ***a response*** to the energy transaction execution engine ***to terminate*** the charging process."

Both the "request signaling a start" and "response . . . to terminate" recited in claim 1 must be messages. The specification explains, among other things, that

- "Request 414 is a message signaling the start of charging process 404." (Ex. 1001 at 12:3-4.)
- "Request 414 informs energy transaction interrupt monitor 402 that charging process 404 has begun." (*Id.* at 12:48-49.)
- "Response 418 is a message that may instruct energy transaction execution engine 416 to terminate charging process 404." (*Id.* at 12:12-14.)

[4] Contrary to the Board's view, PO does not concede that claim 1 or any other challenged claims are representative. (ID at 22.)

Petitioner failed to show that Kimura renders claim 1 obvious because Kimura does not teach or suggest these limitations. Instead, Kimura discloses use of output start charge signals/input start charge signals (Pet. at 13 (citing Ex. 1002 figs. 10A & 12)) and output charge inhibit signal (Pet. at 32 (citing Ex 1002 at 11:30-33).) In a data processing system, a message is a unit of data or information sent from one device to another that includes a header and a body. Use of signals is characteristic of rudimentary energy transactions which are disparaged in the '391 patent (*e.g.*, Ex. 1001 at 6:65–7:2) and is not suitable for more complex, flexible, and interoperable systems and methods disclosed in the '391 patent:

> The illustrative embodiments recognize that the charging transactions by which electric vehicles obtain electricity from an off-vehicle charging station to charge the electric vehicle requires a much more complete, flexible, and interoperable system governing all aspects of the charging transaction.

(*Id.* at 7:12-16.) Petitioner has not provided any evidence to suggest it would have been obvious to use messages instead of signals in Kimura. Therefore, Kimura does not render claim 1 obvious. (Ex. 2005, ¶¶ 92-94.)

2. Claim 4

Claim 4 depends from claim 1. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 4 is not rendered obvious by Kimura for at least all of the reasons discussed above with regard to claim 1 in Section VI.A *supra*. (Ex. 2005, ¶ 95.)

3. Claim 5

Claim 5 recites, in relevant part "wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process." Petitioner argues that Kimura renders claim 5 obvious because it discloses voltage reaching a predetermined target value. (Pet. at 38.)

Petitioner fails to meet his burden as to claim 5. As explained above, the term "preference interruption" means "a set of one or more interruptions that are caused from a violation of a user-specified preference." (*Supra* Part V.C.) Furthermore, claim 5 recites that the preference must be selected by a participant to the charging process. The terms "party" and "participant" are used interchangeably in the '391 patent. (Ex. 1001 at 14:64-65 ("the terms and conditions that were established by ***parties to the charging process***."); *id.* at 7:41-53 ("parties of the transaction").) The parties may include "the owner of the electric vehicle to be charged, the operator of the electric vehicle, the owner of the charging station, and an electric utility company providing electricity to an electric power grid associated with the charging station." (*Id.* at 7:43-49.) Further, under the '391 patent, the parties must agree to conditions relevant to their role in the transaction prior to the charge commencing, "***[d]uring the pre-charge phase***." (*Id.* at 7:49-53 & 7:39.)

In Kimura, the voltage threshold on which Petitioner relies must be preset at the factory because it is saved in EEPROM memory and there is no teaching or suggestion of a user interface that would permit alteration of the preset:

> it is necessary to stop charging when a target value of the terminal voltage during the charging operation is set according to the type of the battery and the terminal voltage reaches this target value.
> A current instruction value I and the ***voltage target value V*** in the constant current charge mode ***are previously stored in an EEPROM (Electrically Erasable Programmable Read Only Memory)*** (not shown) of the battery controller 14 according to the type of the battery 11 to be installed in the electric vehicle 10.

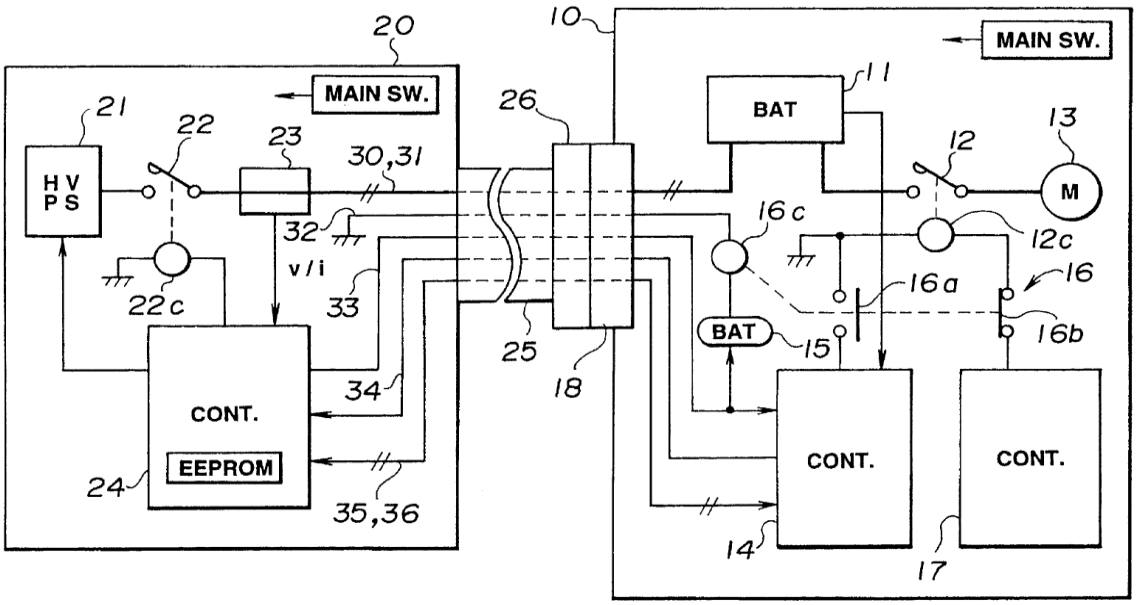
(Ex. 1002 at 5:24-34.) There is no indication in Kimura that the factory setting the preset is a user or a participant as that term is used in the '391 patent. Also, because there is no user-interface or other programming means available to the user, the pre-installed voltage target values stored in the EEPROM cannot be changed by the user and are therefore cannot be user-specified preferences. At the same time, because a factory preset is a given, the actual participants cannot meaningfully agree to it. (*See id.* 7:49-53 & 7:39.) (Ex. 2005, ¶¶ 96-97.)

4. Claim 6

Claim 6 recites: "The computer implemented method of claim 1, wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission." (Ex. 1001 at 17:12-16.) As explained above, the term "data services interruption" should be construed to mean, among other things, an interruption caused by the inability for

information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Part V.A; Ex. 1001 at 13:38-46; *id.* at 8: 38-44.)

Kimura cannot render claim 6 obvious because nowhere does it teach or suggest a data services interruption caused by the inability of information exchange with ***third*** party data sources. Petitioner asserts a sole argument that a data services interruption in Kimura "occurs when the charger controller 24 fails to communicate with the battery controller 14 within a predetermined amount of time (S47-Yes and S49, orange). Ex-1002, 10:41-44." (Pet. at 40.) However, Kimura's charger controller and battery controller are not part of third party structures / services—Kimura explains that the "charger controller 24" and the "battery controller 14" are part of "a preferred embodiment of a charging apparatus for an electric vehicle" depicted in Kimura's Figure 1. (Ex. 1002 at 3:6-7; *see also id.* at 3:7-48.)



(*Id.* fig.1.) Additionally, Kimura discloses that control lines 33 through 36 are control lines to transmit various control signals between the battery controller 14 of the electric vehicle 10 and the controller 24 of the charger 20, without any involvement of third parties. (*Id.* at 3:49-52.)

Furthermore, Kimura's charger controller and battery controller are directly connected via a physical cable. (*Id.* at 3:30-33; *id.* at 3:9-11.) One of Kimura's control lines 33 is exclusively used to transmit a charge start signal and a stop signal from the charger 20 to the electric vehicle 20; another control line 34 is exclusively used to transmit a charge enable signal and an inhibit signal from the electric vehicle 10 to the charger 20). Accordingly, Petitioner failed to show obviousness of claim 6.

Petitioner's claim 6 argument is based on the opinions of its expert Dr. MacCarley. (*See* Pet. at 40-41 (citing Ex. 1009,¶¶ 104-106).) However, Dr. MacCarley apparently was unaware of how the patentees defined a data services interruption in the '391 patent and opined that it is "some disruption of normal data communication from one entity to another or to multiple other targets." (Ex. 2007 at 34:22-25.) Therefore, his opinions on this issue should be accorded little weight. (Ex. 2005, ¶¶ 98-100.)

5. Claim 7

Claim 7 recites, in relevant part, "wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions." Petitioner failed to meet its burden as to claim 7 because it failed to show "detecting by identifying an operational parameter from the set of operational parameters" in Kimura.

To begin, PO's expert Dr. Cameron explained that a POSITA would understand claim 7 to mean that an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions is identified before each new charging transaction. A POSITA would further understand that the '391 patent teaches more flexible and interoperable systems and methods, divided into three phases: pre-charge, charge, and post-charge. After

a previous charging transaction is completed, in the pre-charge phase of a new charging transaction, a user may change an interrupt condition involving one or more operational parameters.

The '391 patent's specification also supports this understanding when it discloses that

> The illustrative embodiments recognize that the charging transactions by which electric vehicles obtain electricity from an off-vehicle charging station to charge the electric vehicle ***requires a much more complete, flexible, and interoperable system*** governing all aspects of the charging transaction. Electric vehicle charging transactions can be divided into the pre-charge phase, the charge phase, and the post-charge phase. ***During the pre-charge phase of decision enablement, all parties are presented with the conditions governing the charging transaction.*** Electricity flows to the electric vehicle and payment is made during the post-charge phase. Finally, during the post-charge phase of the transaction, an analysis is performed to provide incentives and induce specific behaviors on the part of any party involved in the transaction.

(Ex. 1001 at 7:12-25.) The conditions governing the transaction include predefined interrupt conditions, which include rules involving operational parameters. The operational parameters in the predefined interrupt conditions are the set of operational parameters from which the method identifies operational parameters to monitor.

Petitioner argues only that Kimura meets the limitations of this claim because it discloses that "the battery controller 14 detects that the voltage of the battery 11 (operational parameter) conforms to a predetermined voltage threshold

(predefined interrupt)." (Pet. at 42.) However, Petitioner does not explain how Kimura's battery controller "detect[s] by identifying" voltage as an operational parameter from a set of operational parameters conforming to predefined interrupt conditions. (Cameron Dec) On the contrary, Petitioner cites to no disclosure in Kimura where an operational parameter is identified from a set of operational parameters—it simply alleges that it is.

Furthermore, a predetermined voltage threshold is a factory preset that cannot be changed in the pre-charge phase of a charging transaction, as required in the '391 patent.

> During the pre-charge phase, all parties of the transaction are presented with the conditions governing the charging transaction. The parties may include, without limitation, the owner of the electric vehicle to be charged, the operator of the electric vehicle, the owner of the charging station, and an electric utility company providing electricity to an electric power grid associated with the charging station. Parties agree to conditions relevant to their role in the transaction prior to the charge commencing.

(*Id.* at 7:41-49.) (Ex. 2005, ¶¶ 101-105.)

6. Claim 8

Claim 8 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.A.1.) (Ex. 2005, ¶ 106.)

7. Claim 11

Claim 11 depends from independent claim 8. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 11 is not rendered obvious by Kimura for at least all of the reasons discussed above with regard to claim 8 in Part VI.A.6 *supra*. (Ex. 2005, ¶¶ 107.)

8. Claim 12

Petitioner does not provide separate arguments for claim 12. (Pet. at 46.) Because claim 12 recites, in relevant part "wherein the one or more interruptions is the ***preference interruption***, and the preference interruption is detected from a violation of a preference ***selected by a participant to the charging process***[,]" Kimura does not render it obvious for the same reasons as with claim 5. (*Supra* Part VI.A.3.) (Ex. 2005, ¶ 108.)

9. Claim 13

Claim 13 recites: "The computer program product of claim 8, wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission." (Ex. 1001 at 18:1-4.) With claim 13, Petitioner merely argues that "Claims 11-14 are analogous to Claims 4-7, so Claims 11-14 are rendered obvious by Kimura for analogous reasons . . . ." (Pet. at 46.) Accordingly, Petitioner failed to show obviousness of claim 13 at least for the same reason as with claim 6—namely, that Kimura does not teach or suggest a data services interruption caused by the inability for

information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Parts V.A & VI.A.4.) (Ex. 2005, ¶ 109.)

10. Claim 14

Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 46), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.A.5.) (Ex. 2005, ¶¶ 110.)

11. Claim 15

Claim 15 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.A.1.) (Ex. 2005, ¶ 111.)

12. Claims 18

Claim 18 depends from independent claim 15. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 18 is not rendered obvious by Kimura for at least all of the reasons discussed above with regard to claim 15 in Part VI.A.11 *supra*. (Ex. 2005, ¶ 112.)

13. Claim 19

Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 49), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.A.5.) (Ex. 2005, ¶ 113.)

14. Claim 20

Claim 20 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.A.1.) (Ex. 2005, ¶¶ 114.)

B. Ground 2: Kimura in View of Hotta Does Not Render Claims 2, 5, 9, 12, or 16 Obvious

1. Claim 2

Claim 2 recites:

> The computer implemented method of claim 1, wherein the one or more interruptions is a manual override interruption, and wherein the computer implemented method further comprises:
> responsive to receiving, from a user, the manual override interruption, terminating the charging process.

(Ex. 1001 at 16:60-65.) As discussed above, the term "manual override interruption" should be construed as "an instruction that causes [ETEE] to terminate charging process, which a user may generate by interacting with a user interface." (*Supra* Part V.B.)

Petitioner argues that a combination of Kimura and Hotta renders claim 2 obvious. (Pet. at 54-57.) As an initial matter, Petitioner provides substantive arguments only in relation with Hotta. (*Id.* at 54-56.) For Kimura, it provides nothing more than a conclusory and unsubstantiated argument that "pressing Kimura's main switch that functions as taught for Hotta's stop command key" (*id.* at 57), thus this argument should be disregarded.

Petitioner failed to show that Hotta teaches or suggests this limitation for three reasons. ***First***, Hotta does not teach a manual interruption that is an instruction. Rather, it teaches manually pressing the charging stop command key: "The storage battery starts being charged when the charging start command key is

manually pressed, and the charging of the storage battery is stopped when the charging stop command key is manually pressed." (Ex. 1003 at 1:22-26.) No evidence has been presented that pressing the key equates to an instruction as claimed. Thus, Petitioner's argument based on the charging stop command key (Pet. at 55) fails.

Second, Figures 11-12 and 15-16 of Hotta, on which Petitioner relies (Pet. at 55-57) two-stage charging subroutines different from both the '391 patent and Kimura:

> ***FIGS. 9 through 12*** show a subroutine of a sequence for a two-stage constant-current/constant-current charging mode in which the subroutine of the sequence for setting a charging start time corresponds to a two-stage constant-current/constant-current charging mode. ***FIGS. 13 through 16*** show a two-stage charging mode with a constant current at a first stage and a constant voltage at a second stage, in which the subroutine of the sequence for setting a charging start time corresponds to a two-stage constant-current/constant-voltage charging mode.

(Ex. 1003 at 13:38-47; *see also id.* 3:12-17.) Despite of these fundamental differences, Petitioner failed to explain how and why a POSITA would combine Kimura and Hotta at least with respect to claim 2, thus it failed to show that a POSTA would be motivated to combine Kimura and Hotta or would have a reasonable expectation of success.

Third, Dr. MacCarley's opinions regarding claim 2 should be given no weight. To begin, Dr. MacCarley defined "manual override interruption" as "a human being or ***some external, decision-making entity*** providing an input to the

system that would lead to the interruption, the termination, of the charging process." (Ex. 2007 at 43:11-16.) This contradicts both the express language of claim 2 reciting, in relevant part, "receiving, ***from a user***, the manual override interruption"; and the patentees' definition.

Additionally, Dr. MacCarley's opinions on SAE J1772 (Ex. 1009, ¶154) should be disregarded because they were excluded from the Petition, and because arguments incorporated by reference into the Petition are not allowed. See 37 C.F.R. § 42.6(a)(3) ("Arguments must not be incorporated by reference from one document into another document."). (Ex. 2005, ¶¶ 115-120.)

2. Claim 5

Claim 5 recites, in relevant part "wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process." Petitioner argues that Hotta teaches claim 5 because it "regards a charger 2 (purple) configured to ensure that the charging of an electric vehicle is completed by '[an] indicated scheduled boarding time.'" (Pet. at 57.) According to Petitioner, Hotta's boarding-time-selection functionality allows the user to indicate preferences with respect hereto. (*Id.* at 58.)

Petitioner fails to meet its burden as to claim 5 for two reasons. ***First***, claim 5 depends from claim 1, and thus incorporates all of its limitations, including that

the interruption be detected during the flow of electricity. In Hotta, the scheduled time for boarding and using the vehicle are input before the charging begins, *i.e.*, ***not*** during the flow of electricity. As Hotta explains, the disclosed apparatus includes, among other things, a means for inputting the boarding time and

> charging start time calculating means for calculating a charging start time to finish the charging of the storage battery at the indicated scheduled boarding time based on the indicated scheduled boarding time and the calculated necessary charging period, the arrangement being such that the storage battery starts being charged with the predetermined charging current from the calculated charging start time.

(Ex. 1003 at 2:10-21.)

Second, Hotta teaches meeting the preferences instead of failure to do so. Even if the battery cannot be fully charged to meet the boarding time, the controller starts charging the battery:

> If (Tc1+Tc2)>Tn . . . a message indicating that the storage battery 22 cannot be fully charged is displayed on the display unit 55 in a step S31. The controller 21 sets the charging start time Ts to the present time (TS=the present time) in a step S32. Thereafter, the controller 21 executes the charge holding mode "a" and then starts charging the storage battery 22.

(Ex. 1003 at 8:23-38.) In other words, failure to meet the boarding time does not result in the termination of the charging process. Thus, the combination of Kimura and Hotta would not render claim 5 unpatentable. (Ex. 2005, ¶¶ 121-123.)

3. Claim 9

Claim 9 recites, in relevant part, "wherein the one or more interruptions is a manual override interruption, and wherein the computer program product further comprises: fourth program instructions for terminating the charging process in response to receiving, from a user, the manual override interruption." Petitioner does not make separate arguments for this claim (Pet. at 59), thus it fails to show obviousness at least for the same reasons as with claim 2. (*Supra* Part VI.B.1.) (Ex. 2005, ¶ 124.)

4. Claim 12

Petitioner does not provide separate arguments for claim 12. (Pet. at 59.) Because claim 12 recites, in relevant part "wherein the one or more interruptions is the ***preference interruption***, and the preference interruption is detected from a violation of a preference ***selected by a participant to the charging process***[,]" Kimura-Hotta does not render it obvious at least for the same reasons as with claim 5. (*Supra* Part VI.B.2.) (Ex. 2005, ¶ 125.)

5. Claim 16

Claim 16 recites: "The apparatus of claim 15, wherein the one or more interruptions is a manual override interruption, and wherein the processing unit further executes the computer usable program code to terminate the charging process in response to receiving, from a user, the manual override interruption." Petitioner does not make separate arguments for this claim (Pet. at 59), thus it fails

to show obviousness at least for the same reasons as with claim 2. (*Supra* Part VI.B.1.) (Ex. 2005, ¶ 126.)

C. Ground 3: Kimura in View of King Does Not Render Claims 3, 10, or 17 Obvious

For all claims in Ground 3 (claims 3, 10, and 17), Petitioner argues that Kimura-King teaches "storing the set of operational parameters in a storage device" because King discloses storing parameters, such as battery temperature profile, ampere-hours of charge, battery charge profile, and charger status. (Pet. at 61-63.)

This argument fails because in King, those parameters have nothing to do with monitoring for and detecting interruptions. Rather, they are used to calculate the amount of recharge the battery requires:

> Operation of charger 24 is controlled by controller 36 in response to the measured parameters (current, voltage and battery temperature) and the stored data in memory34. Once controller 36 has calculated the net ampere-hour discharge using the above equations, the amount of recharge current can be determined from the following relationships.

(Ex. 1004 at 5:49-54.) Indeed, the purpose of King is to prevent overcharging of old batteries:

> The intelligent battery charger of the invention provides compensation to prevent overcharging of aged batteries. In addition, the computed state of charge, as shown by indicator 32 on the vehicle instrument panel, is compensated for the battery's reduced capacity as a result of battery age, operation at low battery temperatures, and excessive discharge rates.

(*Id.* at 5:42-48.) Thus, the proposed combination would not meet the limitations of claims 3, 10, and 17, and Petitioner's Ground 3 fails. (Ex. 2005, ¶¶ 127-128.)

D. Ground 4: Keith Does Not Anticipate Claims 1, 2, 4-9, 11-16, or 18-20

1. Claim 1

As discussed in Ground 1, the recited "request" and "response" in elements 1[a] and 1[d] are messages and not merely signals, that are characteristic of rudimentary charging transactions that the '391 patent disparages. (*See* Part VI.A.1; Ex. 1001 at 6:65–7:2; Ex. 1001 at 7:12-16.)

Keith cannot anticipate claim 1 at least because Keith discloses use of signals (keys) instead of a "request," as Petitioner admits. (Pet. at 65-66.) For example, Keith explains

> The charge station computer (FIG. 13) then reaches a step 387 which ***sends a five second warning to the vehicle charge computer, key h,*** which causes the vehicle program (FIG. 14) to advance from test 386 to a pair of steps 388 where the display informs the operator that the communication phase is ending and the charge phase is going to begin, and then sends a confirming break, key j, in a step 389, and then goes into a one second wait at a step 390.

(Ex. 1005 at 20:15-23.)

Petitioner asserts that Keith discloses a "response" because the vehicle physically, mechanically, de-energizes the vehicle contact relay. (Pet. at 78.) As noted previously, in a data processing system, a message is a unit of data or information sent from one device to another that includes a header and a body.

De-energizing a relay is not a message, either. Thus, Keith does not anticipate claim 1. (Ex. 2005, ¶¶ 129-131.)

2. Claim 2

Claim 2 recites:

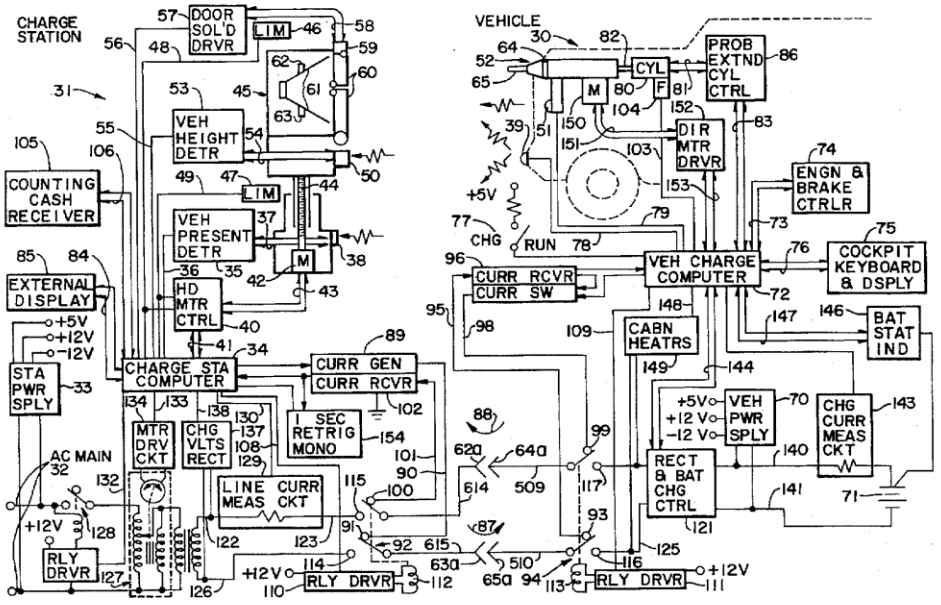
> The computer implemented method of claim 1, wherein the one or more interruptions is a manual override interruption, and wherein the computer implemented method further comprises:
> responsive to receiving, from a user, the manual override interruption, terminating the charging process.

(Ex. 1001 at 16:60-65.) As discussed above, the term "manual override interruption" should be construed as "an instruction that causes [ETEE] to terminate charging process, which a user may generate by interacting with a user interface." *Supra* Part V.B.

Petitioner argues that Keith anticipates claim 2 because it purportedly discloses that "a manual override interruption occurs when 'the operator moves a charge[/]run switch 77 into the open position.'" (Pet. at 80.) Moving a charge/run switch into the open position under Keith cannot anticipate claim 2 at least for four reasons.

First, physically moving a charge/run switch as taught by Keith is not the same as generating an instruction as claimed. As an initial matter, Petitioner refers to an operator ***moving*** charge/run switch into the open position under Keith. (*Id.* at 80.) Moving a switch into the open/close position is a physical action different

from generating an instruction. The passage on which Petitioner relies states in relevant part: "Assuming that the diagnostics are successful, the vehicle operator can indicate that a battery charge is to be acquired by closing a charge/run switch 77, which may be a discrete switch or may simply be a suitable keyboard input . . . ." (Ex. 1005 at 6:3-7.) Keith's charge/run switch in the open position is shown in Figure 1.



(Ex. 1005 fig.1.)

As PO's expert Dr. Cameron explained, discrete settings are settings that are either "on" or "off," "true" or "false." A discrete switch is a switch with only discrete and not continuous settings. Closing the discrete switch in Keith is akin to turning on a simple light switch—if a user wants to acquire charge, nothing more that manually moving the switch into the "on" position is required.

Further, Keith's mechanical "discrete switch," as shown in Keith's Figure 1, cannot be an instruction. Dr. Cameron explained that a POSITA would understand "instruction," as that term is understood in the '391 patent to mean "an encoding of a series of operational steps specifying the details to be executed according to those operational steps." (*E.g.*, Ex. 1001 at 15:13-16 ("[E]ach block in the flowchart or block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s).").) A discrete manual switch is not the same as encoding instructions.

Second, Keith's "suitable keyboard input through the cockpit keyboard and display system 75" is not an instruction, either. (*See* Ex. 1005 at 6:6-7.) Again, as Dr. Cameron opined, "an encoding of a series of operational steps specifying the details to be executed according to those operational steps." And a POSITA would understand that an instruction goes beyond the mechanical operation of pressing a button on a keyboard. Because the keyboard/display in Keith may be used as a discrete switch, a POSITA would understand that any input from the keyboard would be interpreted as that of a discrete switch sending discrete signals—for example, hitting a keyboard once to signal for the charge to proceed:

> So, in summary, the focus in Keith (Ex. 1005 at 6:3-8) is on a signal that triggers a charge if diagnostics (interpreted by the user) indicate the need for acquiring one. A discrete switch is provided as an example, and a keyboard input that sends a discrete signal to proceed is

> provided as a second example. In both cases, the user's required manual involvement triggers a discrete signal to proceed with the charge at the user's discretion.

Therefore, because the keyboard input is an equivalent of turning the charge/run switch on/off, a POSITA would understand that an operator is inputting one of two available choices (on/off) and not generating instructions for the vehicle charge computer to interpret.

Third, Keith does not disclose that transferring a charge/run switch into the open position ***causes ETEE*** to terminate charging process. Under Keith, when "the operator transfers the charge run switch 77 into the open position," this action—and not the ETEE—stops the charge. (Ex. 1005 at 8:30-31.)

To the extent Petitioner takes the position that moving the charge/run switch causes a computer to terminate the charging process, that computer cannot be the ETEE, either, because the charge/run switch in Keith is coupled with the vehicle charge computer 72, which serves as the ETIM. (Ex. 1005 fig.1.) The station charge computer 34 is not coupled with/connected to the charge/run switch. (Ex. 1005 fig.1.) Keith illustrates this point by disclosing that, when an operator moves the charge/run switch to the close position, this causes follow-up actions in the vehicle charge computer (ETIM) and not the station charge computer (ETEE):

> Ultimately, when the operator decides that a charge is in order, closure of the charge/run switch 77 (FIG. 1) will cause an affirmative result of step 178 which causes the vehicle charge computer 72 to advance to a payment/battery initialization routine.

(Ex. 1005 at 10:53-57.)

Fourth, Keith does not go through the same process of identifying the manual override notification as an interruption and comparing it against predefined interrupt conditions (steps 72 and 704) as required in the '391 patent:

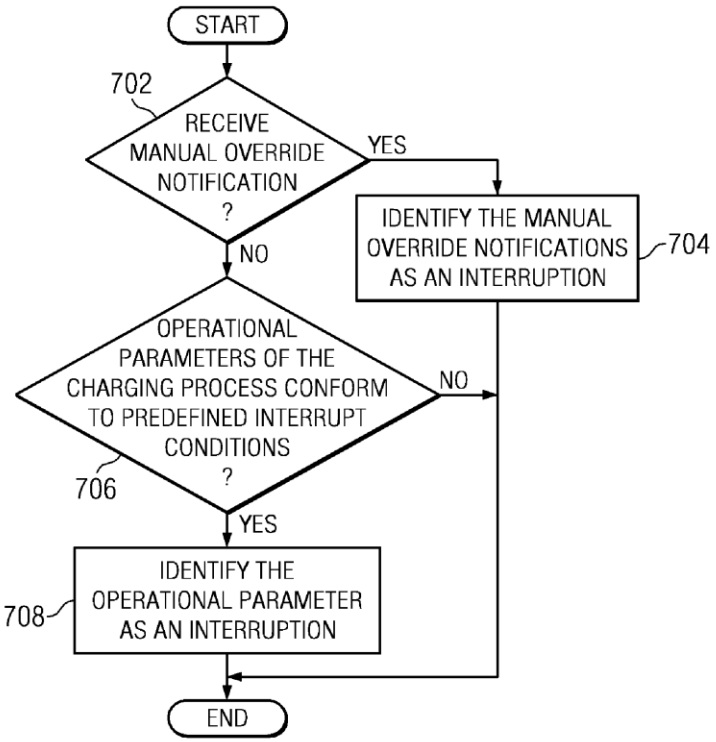


FIG. 7

(*Id.* fig.7.) As the '391 patent's specification explains,

> the process begins by making the determination as to whether an operational parameter of the charging process conforms to predefined interrupt conditions (step 702). The predefined interrupt conditions are predefined interrupt conditions, such as predefined interrupt conditions 412 in FIG. 4. If the process makes the determination that an operational parameter of the charging process conforms to predefined interrupt conditions, then the process identifies the operational parameter as an interruption (step 704).

(*Id.* at 14:22-30.) The same steps of monitoring and detecting are recited in claim 1 of the '391 patent from which claim 2 depends. These are absent from Keith. Thus, Keith's disclosure of a user moving a charge/run switch into the open position is not enough for anticipation. *Net MoneyIN*, 545 F.3d at 1371.

Petitioner's arguments to the contrary fail for three reasons. ***First***, Petitioner argues that "[i]n Keith, a manual override interruption occurs when 'the operator moves a charge[/]run switch 77 into the open position[.]" (Pet. at 80.) As explained above, physical movement of a charge/run switch into the open position under Keith is different from an generating an instruction that causes ETEE to terminate the charging process.

The first (of two) passage from Keith on which Petitioner relies support PO's position or are inapposite. The first passage—"The charge will continue until something goes awry, the credit established by the counting cash receiver 105 is exhausted, or the operator transfers the charge run switch 77 into the open position" (Ex. 1005 at 8:29-32)—shows that the operator's action terminates the charge instead of causing the ETEE to terminate the charging process. The second passage from Keith that Petitioner cites merely states how the vehicle is receiving charging power over physical connections. (*See* Pet. at 80 (citing Ex. 1005 at 8:1-6).)

Second, Petitioner argues that Keith anticipates claim 2 because "Keith, just like the '391 Patent (Ex-1001, 12:26-31), also explains that its charge/run switch 77 can be part of a user interface. Ex-1005 at 6:6-8[.]" (Pet. at 81.) To begin, the cited portion of the '391 patent's disclosure explains that a user may generate a manual override interruption by interacting with a user interface (Ex. 1001 at 12:36-31) and is devoid of any mention of the charge/run switch. And the cited portion of Keith's disclosure explains:

> Assuming that the diagnostics are successful, the vehicle operator can indicate that a battery charge is to be acquired by closing a charge/run switch 77, which may be a discrete switch, or may simply be a suitable keyboard input through the cockpit keyboard and display system 75. It is response to the closing of the charge/run switch 77 (or equivalent) that causes ***the computer 72*** to provide signals on lines 78 and 79 ***to cause the infrared transmitter 39 and laser diode 51 to emanate radiation***, as described hereinbefore.

(Ex. 1005 at 6:3-13.) This disclosure does not support Petitioner's position at least because it (1) speaks of what happens after the closing of the charge/run switch and ***not*** after its opening; and (2) discloses that the closing of that switch causes the infrared transmitter and laser diode mounted on the vehicle to emanate radiation to communicate with the vehicle height detector, which has nothing to do with terminating the charging process (Ex. 1005 at 5:30-39).

Third, opinions of Petitioner's expert Dr. MacCarley should be given no weight in connection with claim 2 because Dr. MacCarley defined "manual override interruption" as "a human being or ***some external, decision-making entity***

providing an input to the system that would lead to the interruption, the termination, of the charging process." (Ex. 2007 at 43:11-16.) This contradicts

- the language of claim 2 reciting, in relevant part, "receiving, ***from a user***, the manual override interruption";
- the patentees' definition, and
- Petitioner's position that the manual override interruption is received from a "vehicle owner/operator" (Pet. at 82). (Ex. 2005, ¶¶ 132-144.)

3. Claim 4

Claim 4 depends from independent claim 1. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 4 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 1 in Part VI.D.1 *supra*. (Ex. 2005, ¶¶ 145.)

4. Claim 5

Claim 5 recites, in relevant part, "wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a ***violation*** of a preference selected by a participant to the charging process." Petitioner asserts only that Keith anticipates claim 5 because "[o]ne preference interruption in Keith involves exhaustion of the cash deposited by the user for charging. Ex-1005, 22:27-28. This is a preference selected by a participant to the charging process." (Pet. at 84.)

Petitioner's argument fails because even assuming that charging the battery until the cash deposit is exhausted is a preference, stopping the charging process when the cash deposit is exhausted ***meets*** that preference instead of violating it. Additionally, by Petitioner's logic, a violation of the preference to charge the battery until the deposit is exhausted may mean that the charging process would stop prematurely, costing a pecuniary loss to the user "because the machine won't give a refund." (Ex. 1005 at 17:64). But the only remedy for stopping the charging process prematurely would be terminating the charging process. That simply cannot be the case. (Ex. 2005, ¶¶ 146-147.)

5. Claim 6

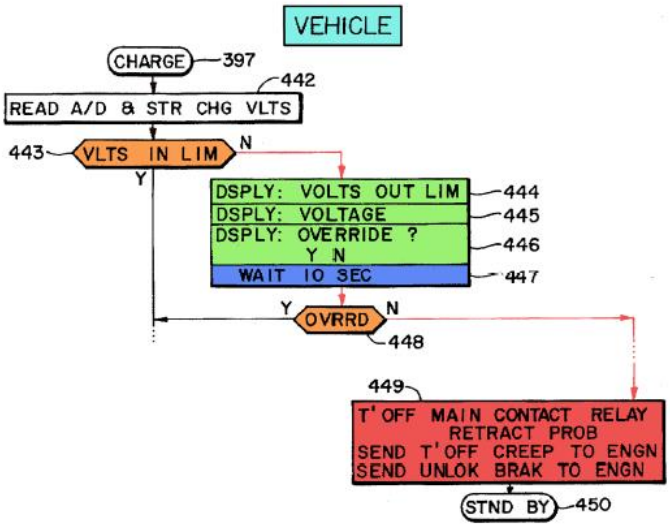
As explained above, the term "data services interruption" in claim 6 should be construed to mean, among other things, an interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Part V.A; Ex. 1001 at 13:38-46 *&* 8: 38-44.) Keith does not anticipate claim 6 because it does not teach or suggest an interruption caused by the inability for information to be exchanged with a set of one or more third party data sources.

Petitioner only argues that Keith meets claim 6's limitations because it discloses that over-the-limit voltage may be detected,

> followed by a sequence of display steps 444-446 (green) at the vehicle leading to a request for data from a user (i.e., whether or not to override) and a response-waiting period of 10 seconds at step 447 (blue). Ex-1005, 23:16-39. If no response is received after 10 seconds (***an***

> ***interruption in data services from the user failing to respond in time***), then the logic proceeds to 449 (red) and the charging process is terminated.

(Pet. at 85.)



(Pet. at 86 (excerpting a portion of Ex. 1005 fig. 16) (color added by Petitioner).) A user, however, is not a third-party data source, which under the '391 patent include, for example, weather information sources, traffic information sources, map and travel information sources, charging station price information Sources, or any other third party information sources. (*Id.* at 8: 38-44.)

Additionally, under element 1[d] of the '391 patent, this purported interruption should result in the energy transaction interrupt monitor sending a response to the energy transaction execution engine, and then the energy transaction execution engine should terminate the charging process. (*E.g.*, Ex. 1001 at 12:56-59.) In contrast, in Keith, after displaying the override question and

receiving no response, the vehicle charge computer—corresponding to the energy transaction interrupt monitor and not energy transaction execution engine, as required by element 1[d]—deenergizes the vehicle main contact relay 94. (Ex. 1005 at 23:30-31; *id.* fig. 16 (displaying vehicle-side steps).) Thus, the wrong element terminates the charging process in this purported data services interruption under Keith.

Lastly, Keith calls the user/operator response in the situation above "the override." (Ex. 1005 at 23:41; *id.* fig. 16 (step 446 "Display: Override").) PO does not concede that Keith discloses manual override interruptions claimed in the '391 patent (it does not, as explained in relation to claim 2, *see supra* Part VI.D.2), but notes that the '391 patent recites manual override interruptions in claim 2, 9, and 16. Petitioner's equating manual override interruptions with the data services interruptions would largely render claims 2, 9, and 16 of the '391 patent superfluous, which is contrary to the doctrine of claim differentiation. *See Versa Corp. v. Ag-Bag Int'l Ltd.*, 392 F.3d 1325, 1330 (Fed. Cir. 2004) ("The doctrine of claim differentiation 'creates a presumption that each claim in a patent has a different scope.' The difference in meaning and scope between claims is presumed to be significant 'to the extent that the absence of such difference in meaning and scope would make a claim superfluous.'") (internal quotation marks and citations omitted). (Ex. 2005, ¶¶ 148-151.)

6. Claim 7

Claim 7 recites, in relevant part, "wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions." Petitioner failed to meet its burden as to claim 7 because it failed to show "detecting by identifying an operational parameter from the set of operational parameters" in Keith.

As explained in Ground 1 (*supra* Part VI.A.5), a POSITA would understand claim 7 to mean that an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions ***is identified before each new charging transaction, during the pre-charge phase***. (Ex. 1001 at 7:12-25.) The conditions governing each transaction include predefined interrupt conditions, which include rules involving operational parameters. The operational parameters in the predefined interrupt conditions are the set of operational parameters from which the claimed invention identifies operational parameters to monitor.

Petitioner argues only that Keith anticipates claim 7 because it discloses "determin[ing] if the current provided by the line current measuring circuit 129 … exceeds a current limit which is established by manufacturer's data." (Pet. at 87.) However, Petitioner does not explain whether the current limit is an operational

parameter identified from a set of operational parameters that conform to a set of predefined interrupt conditions. Furthermore, a current limit preestablished by manufacturer's data cannot be changed in the pre-charge phase of a charging transaction, as required in the '391 patent. (Ex. 1001 at 7:41-49.) (Ex. 2005, ¶¶ 152-154.)

7. Claim 8

Claim 8 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.) (Ex. 2005, ¶¶ 155.)

8. Claim 9

Claim 9 recites, in relevant part "wherein the one or more interruptions is a manual override interruption, and wherein the computer program product further comprises: fourth program instructions for terminating the charging process in response to receiving, from a user, the manual override interruption." Petitioner does not advance any substantive arguments regarding claim 9, therefore it failed to show that Keith anticipates this claim for at least the same reasons as with claim 2. (*See supra* Part VI.D.2.) (Ex. 2005, ¶¶ 156.)

9. Claim 11

Claim 11 depends from independent claim 8. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore,

claim 11 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 8 in Part VI.D.7 *supra*. (Ex. 2005, ¶ 157.)

10. Claim 12

Petitioner does not provide separate arguments for claim 12. (Pet. at 90.) Because claim 12 recites, in relevant part "wherein the one or more interruptions is the ***preference interruption***, and the preference interruption is detected from a violation of a preference ***selected by a participant to the charging process***[,]" Keith does not anticipate it for the same reasons as with claim 5. (*Supra* Part VI.D.5.) (Ex. 2005, ¶ 158.)

11. Claim 13

With claim 13, Petitioner merely argues that "Claims 9 and 11-14 are otherwise analogous to Claims 2 and 4-7, respectively, so these claims are anticipated for reasons analogous to those. . . ." (Pet. at 90.) Accordingly, Petitioner failed to show obviousness of claim 13 at least for the same reason as with claim 6—namely, that Kimura does not teach or suggest a data services interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Parts V.A & VI.D.5.) (Ex. 2005, ¶ 159.)

12. Claim 14

Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 90), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.D.6.) (Ex. 2005, ¶ 160.)

13. Claim 15

Claim 15 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.) (Ex. 2005, ¶ 161.)

14. Claim 16

Petitioner does not advance any substantive arguments regarding claim 16, therefore it failed to show that Keith anticipates this claim for at least the same reasons as with claim 2. (*See supra* Part VI.D.2.) (Ex. 2005, ¶ 162.)

15. Claim 18

Claim 18 depends from independent claim 15. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 18 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 15 in Part VI.D.13 *supra*. (Ex. 2005, ¶ 163.)

16. Claim 19

Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 93), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.D.6.) (Ex. 2005, ¶ 164.)

17. Claim 20

Claim 20 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.) (Ex. 2005, ¶¶ 165.)

E. Ground 5: Keith Does Not Render Claims 3 or 8-19 Obvious

1. Motivation to Combine Keith with POSITA's Knowledge

Petitioner does not even attempt to show that a POSITA would be motivated to combine the teachings of Keith with its knowledge in the art or that a POSITA would have a reasonable expectation of success. (*See* Pet. at 95.) Notably, Dr. MacCarley conceded at his deposition that he did not provide a separate obviousness analysis (which should have included a POSITA's motivation to combine and likelihood of success) because he did not think he was required to do so:

> Q. Okay. So, Dr. MacCarley, are—are there any elements of Independent Claim 1 that are not disclosed in Keith but would have been obvious in your opinion?
> A. Well, let me answer that two ways. It's my contention that Claim 1 is anticipated by Keith, which I think technically means that nothing needed to be obvious if it was already anticipated. That's a stronger criteria.
> . . .
> A. . . . So as you asked the question, did I feel anything—did I feel the need to use obviousness to connect the dots on any of these? No.

(Ex. 2007 at 71:23–72:19.)

This alone is enough to dismiss Petitioner's Ground 5. (Ex. 2005, ¶¶ 166.)

2. Claim 3

Petitioner argues that Keith discloses storing cost and kilowatt hours and that it would have been obvious to store the purported operational parameters in a

storage device. (Pet. at 95-97.) Petitioner's argument that Keith renders claim 3 obvious fail for three reasons.

First, kilowatt hours and cost are not operational parameters, and Petitioner admits as much—"Keith does not appear to disclose using these two parameters at the vehicle charge computer 72 for interruption detection . . . . ." (Pet. at 96.)

Second, storing kilowatt hours and cost in Keith have nothing to do with monitoring for and detecting interruptions. Rather, they are calculated and stored to prevent overpayment by the customer:

> The calculation of kilowatt hours employs straightforward sampling of volts and amps on a cyclic basis, and utilizing a constant related to cycle time to multiply into volt-amp-hours. The cost is simple multiplication of rate; either absolute or selected by real time from a table. Then, a test 435 ***determines if the amount of cash which has been deposited is exhausted***.

(Ex. 1005 at 22:22-28; *see also id.* at 17:61-64 ("calculate a maximum fee that the operator should insert in order to avoid overpaying. This is to prevent paying for more power than the vehicle can use: the machine won't give a refund.").)

Third, Petitioner argues that Keith discusses displaying current and voltage, and that a POSITA would understand that a display requires storage of those parameters. (Pet. at 96-97.) This argument is contradicted by Keith's disclosures because it expressly and consistently indicates when a measurement is stored or merely displayed. Regarding kilowatt hours and cost, calculating, storing, and displaying is disclosed. (*See, e.g.*, *id.* at 23:60-61 ("calculates and stores the

kilowatt hours and cost so far"); *id.* at 22:25-29 ("The cost is simple multiplication of rate; either absolute or selected by real time from a table. Then, a test 435 determines if the amount of cash which has been deposited is exhausted.").) Petitioner cannot point out to a similar disclosure with current or voltage. (*See id.* at 21:58-63 ("If there is so low a current as to indicate a bad connection, an affirmative result of test 421 will reach a step 424 in which the external display 85 provides an indication to the operator that there is a bad connection between the vehicle and the station and that the operator should try the process all over again."); *id.* at 22:5-8 (If there is excessive current, an affirmative result of the test 426 will reach a step 428 which causes the external display 85 (FIG. 1) to provide an indication to the operator that there is excess current[.]").) (Ex. 2005, ¶¶ 167-170.)

3. Claim 8

Claim 8 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.) (Ex. 2005, ¶ 171.)

4. Claim 9

Petitioner did not advance any substantive arguments that claim Keith renders claim 9 obvious and relied instead on its anticipation assertions. (Pet. at

98.) Thus, it failed as to claim 9 for the same reasons as in Ground 4. (*See supra* Part VI.D.8.) (Ex. 2005, ¶ 172.)

5. Claim 10

Petitioner did not advance any substantive arguments that claim Keith renders claim 10 obvious and relied instead on its anticipation assertions. (Pet. at 98.) Thus, it failed as to claim 10 for the same reasons as with claim 3. (*See supra* Part VI.E.2.) (Ex. 2005, ¶ 173.)

6. Claim 11

Claim 11 depends from independent claim 8. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 11 is not rendered obvious by Keith for at least all of the reasons discussed above with regard to claim 8 in Part VI.E.3 *supra*. (Ex. 2005, ¶ 174.)

7. Claim 12

Petitioner did not advance any substantive arguments that claim Keith renders claim 12 obvious and relied instead on its anticipation assertions. (Pet. at 98.) Thus, it failed as to claim 9 for the same reasons as in Ground 4. (Ex. 2005, ¶ 175.)

8. Claim 13

In addition to failure to show that a POSITA would have a motivation to combine Keith and with his background knowledge and a reasonable likelihood of success, Petitioner failed to make any separate arguments regarding obviousness of

claim 13 in view of Keith. (*See* Pet. 98; *see also* Paper 13 at 3.) Instead, Petitioner argued that Keith renders this claim obvious because it allegedly anticipates it. (*Id.* at 98.) Accordingly, Petitioner's argument additionally fails for the same reason as Keith's anticipation arguments for claims 6 and 13. (*See supra* Parts VI.D.5 & D.10.) (Ex. 2005, ¶ 176.)

9. Claim 14

Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 98), thus its challenge fails at least for the same reasons as with claim 7 in Ground 4. (*Supra* Part VI.D.6.) (Ex. 2005, ¶ 177.)

10. Claim 15

Claim 15 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1 in Ground 4. (*Supra* Part VI.D.1.) (Ex. 2005, ¶ 178.)

11. Claim 16

Petitioner did not advance any substantive arguments that claim Keith renders claim 16 obvious and relied instead on its anticipation assertions. (Pet. at 99.) Thus, it failed as to claim 9 for the same reasons as in Ground 4. (*See supra* Part VI.D.8.) (Ex. 2005, ¶ 179.)

12. Claims 17

Petitioner did not advance any substantive arguments that claim Keith renders claim 17 obvious and relied instead on its anticipation assertions. (Pet. at

99.) Thus, it failed as to claim 3 for the same reasons as with claim 3 and Ground 4. (*See supra* Part VI.E.2.) (Ex. 2005, ¶ 180.)

13. Claim 18

Claim 18 depends from independent claim 15. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 18 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 15 in Part VI.E.10 *supra*. (Ex. 2005, ¶ 181.)

14. Claim 19

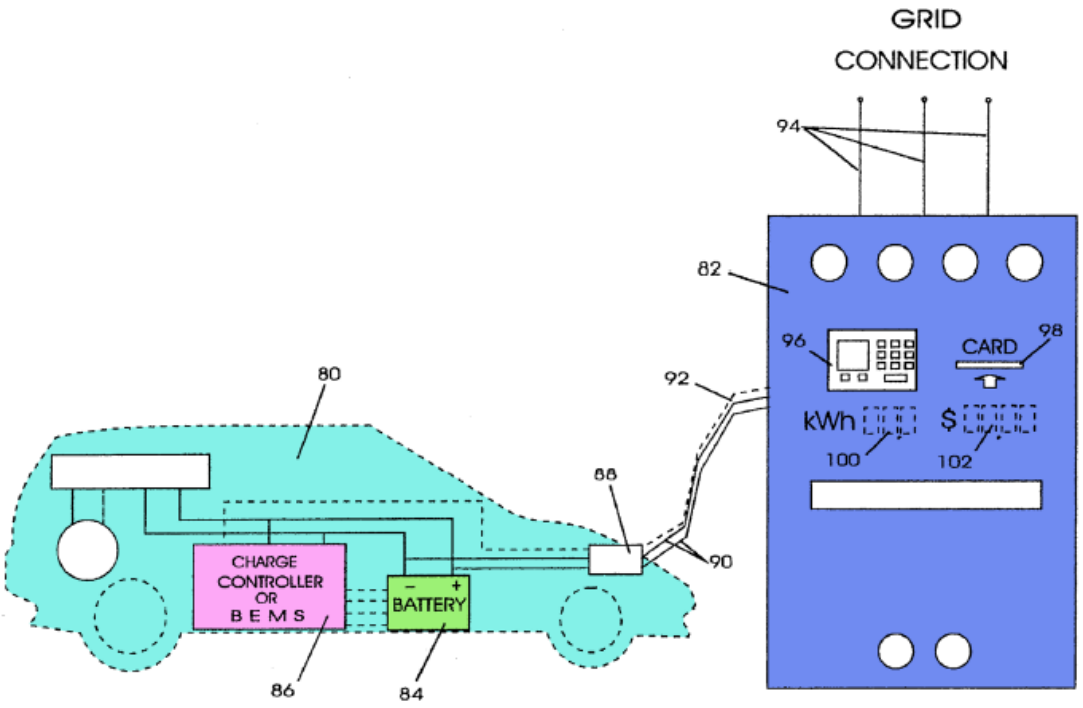
Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 99), thus its challenge fails at least for the same reasons as with claim 7 in Ground 4. (*Supra* Part VI.D.6.) (Ex. 2005, ¶ 182.)

F. Ground 6: Keith in View of Nor Does Not Render Claims 6 or 13 Obvious

1. Claim 6

As explained above, the term "data services interruption" should be construed to mean, among other things, an interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Part V.A; Ex. 1001 at 13:38-46; *id.* at 8: 38-44.) A Keith-Nor combination cannot render claim 6 obvious because nowhere does it teach or suggest a data services interruption caused by the inability of information exchange with ***third*** party data sources.

For claim 6, Petitioner relies only on Nor and asserts a single argument that Nor renders obvious the additional limitations of claim 6 because it discloses "a data services interruption occurs when the battery charge controller 86 (pink) of the electric vehicle 80 (turquoise) fails to communicate with the charging station 82 (purple). Ex-1006, 4:52-63." (Pet. at 101.)



(Pet. at 101 (citing Ex. 1006 fig. 2 (color added by Petitioner).)

However, Nor does not teach or suggest communications/ failure to communicate with third parties service . Rather, it concerns communications between the vehicle side and the charging station and speaks only of "***communication means*** that are capable of transferring ***data concerning the state of charge*** of the battery being charged ***between the battery and the charging station***[,]" *i.e.*, without involvement of third parties. (*See* Ex. 1006 at 2:53-55.) The exceprt from Nor cited by Petitioner discloses "a monitoring system which monitors the data communication link ***between the electric batter***y being charged ***and the power station***, and the charge controllers may be established in such a

manner that they continuously monitor and exchange signals periodically . . . ." (*Id.* at 4:52-63.)

As discussed in Ground I, Dr. MacCarley's opinions regarding data services interruptions should be given no weight because he was not aware that the patentees furnished their own definition if this term in the '391 patent's specification. (Ex. 2007 at 34:22-25); *supra* Part VI.A.)

2. Claim 13

Petitioner makes an attorney argument that Keith-Nor renders claim 13 because it is similar to claim 6 and because Keith anticipates claim 8. (Pet. at 103.) To the extent PO is required to address this unsubstantiated assertion, it fails for the same reason as Petitioner's claim 6 argument *supra* Part VI.F.1. (Ex. 2005, ¶¶ 183-186.)

VII. DR. MACCARLEY'S TESTIMONY SHOULD BE ACCORDED LITTLE WEIGHT BECAUSE OF HIS CONNECTIONS WITH TESLA

Dr. MacCarley's testimony should be given little—if any—weight due to bias because he has received material support for his academic activities and other benefits from Tesla—Petitioner in this IPR. *See Varian Med. Sys. v. William Beaumont Hospital*, IPR2016-00169, Paper 79 at 30, 2017 Pat. App. LEXIS 5415 at *45 (P.T.A.B. May 4, 2017) ("A financial interest is certainly a factor in deciding how much weight to give [an expert's] testimony.").

For instance, Dr. MacCarley admitted during his deposition that

- his connection with Tesla has lasted a decade (Ex. 2007 at 78:21-22);
- he received "two Tesla North American standard chargers, Level 2 chargers, charge ports, for educational purposes[]" (*id.* at 78:23–79:1);
- on several occasions, he and his students were allowed access to Tesla's facilities, including in Tesla's "earliest days when they were operating out of not much more than a garage, converting Lotus Elises to Tesla Roadsters[]"and that at that time Tesla "shared some of their batteries with us" (*id.* at 79:14–80:1);
- he took his students to view Tesla's facilities in the area, including in Palo Alto (*id.* at 80:13-15);
- he and his students received opportunities to see how Tesla "build their vehicles and chargers and—and some of their innovative marketing too[]" (*id.* at 80:17-20);
- he was "instrumental" in forwarding his best students to Tesla's recruiters, resulting in at least thirty of his students accepting job offers from Tesla (*id.* at 81:2-12);
- a Tesla recruiter is his former student (*id.* at 81:9-12); and
- he considers Tesla jobs to be one of the most prestigious opportunities for his students (*id.* at 81:13-18).

This clearly creates a conflict of interest prejudicial to PO. To make things worse, neither Petitioner nor Dr. MacCarley had disclosed his connection to Petitioner and material support he received from them. For these reasons, the Board should give little weight to Dr. MacCarley's testimony.

VIII. CONCLUSION

Accordingly, all challenged claims should be upheld as valid.

Respectfully submitted,

DEVLIN LAW FIRM LLC

Dated: November 8, 2024

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that there are 13,259 words in this paper, excluding any table of contents, table of authorities, mandatory notices under 37 C.F.R. § 42.8, certificate of word count, certificate of service, or appendix of exhibits. This certification relies on the word count of the word-processing system used to prepare this paper.

Respectfully submitted,

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CERTIFICATE OF SERVICE
UNDER 37 C.F.R. § 42.6(e)(4)

The undersigned hereby certifies that a copy of the foregoing PATENT OWNER'S' RESPONSE was served on November 9, 2024, by filing this document through the Patent Trial and Appeal Board End to End System as well as delivering a copy via electronic mail upon the following email addresses for the attorneys of record for the Petitioner: Tesla-Graphite391-IPR@morganlewis.com and pmargulies@tesla.com.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

GRAPHITE CHARGING COMPANY, LLC,
Patent Owner

Case: IPR2024-00387

U.S. Patent No. 8,103,391

EXPERT DECLARATION OF DR. KIRK W. CAMERON IN SUPPORT OF PATENT OWNER'S RESPONSE

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I. INTRODUCTION

1. My name is Dr. Kirk W. Cameron and I reside in Alexandria, Virginia. I have been retained as a technical expert by counsel for Patent Owner Graphite Charging Company, LLC ("Graphite Charging" or "Patent Owner") to provide expert opinion testimony in the above-captioned matter.

2. I have been asked to render opinions on Petitioner's unpatentability arguments regarding U.S. Patent No. 8,103,391 ("the '391 Patent") that have been identified in the Petition. Specifically, I have been asked to consider whether certain references disclose or suggest the features recited in claims 1–20 of the '391 patent.

3. This report contains statements of my opinions formed to date regarding these references and the '391 Patent and the bases and reasons for those opinions. I may offer additional opinions based on further review of materials in this case, including opinions and/or testimony of other expert witnesses.

4. Based upon the materials that I have considered, and the arguments made by Petitioner and Dr. MacCarley, as explained below it is my opinion that Petitioner has failed to meet its burden to show that any challenged claim of the '391 Patent is unpatentable.

II. QUALIFICATIONS

5. This is a summary of my background and qualifications. I set forth my background in more detail in my Curriculum Vitae ("CV")

6. I graduated from the University of Florida with a Bachelor of Science degree in Mathematics in 1994. Subsequently, I attended Louisiana State University, where I earned a Doctor of Philosophy in Computer Science in 2000.

7. After earning my Ph.D., I taught Computer Science at the University of South Carolina for four years before moving to my current position at the Virginia Polytechnic Institute & State University ("Virginia Tech") in 2005. At Virginia Tech, I am a tenured Professor of Computer Science as well as the inaugural faculty lead and Associate Vice President for Academic Affairs at Virginia Tech's Innovation Campus in Alexandria, Virginia. My research focuses on issues related to improving power and performance efficiency in high performance computing (HPC) systems and applications.

8. From 2012-2022, I was Director of the stack@cs Center for Computer Systems (ranked #26 by US News in 2022). I was the inaugural Associate Department Head for Research and Engagement from 2018-2022. I was Associate Department Head and Graduate Program Director from 2014-2017. I held a Distinguished Visiting Fellowship at Queen's University, Belfast and I was a

distinguished visitor to the U.K. Royal Academy of Engineering during the 2017-2018 academic year.

9. I am a Fellow of IEEE based on my contributions to measurement and management of energy in high-performance computing systems. The IEEE Grade of Fellow is conferred on members with extraordinary records of professional technical accomplishments. The total number of fellows selected world-wide in any one year does not exceed one-tenth of one percent of the total voting Institute membership.

10. I am a Distinguished Member of the ACM. Since 2015, I have served as an associate editor for the Journal of Parallel and Distributed Computing and I am currently the Associate Editor in Chief for IEEE Transactions on Parallel and Distributed Computing.

11. My work was initially funded by the prestigious National Science Foundation CAREER Award in 2004. The Faculty Early Career Development (CAREER) Program is a Foundation-wide activity that offers the National Science Foundation's most prestigious awards in support of early-career faculty who have the potential to serve as academic role models in research and education and to lead advances in the mission of their department or organization. As a result of this investment, my research findings pioneered the creation of energy measurement

and management technologies that, among other things, influenced the creation of the Energy Star program for compute servers.

12. I've been awarded over $15M from external funding sources. These investments in my work resulted in over 100 publications in highly selective professional journals and conferences. Moreover, the work led to the issuance of U.S. Patent No. 8,918,657 ("the '657 patent"), entitled "Systems, Devices, and/or Methods for Managing Energy Usage," on which I am listed as a co-inventor.

13. The '657 patent formed the foundational technology used in the venture-backed startup company, MiserWare, that I co-founded in 2006. This patent describes power and energy management techniques that control power and energy use of various devices in deployments. The grano.la software was one commercial embodiment, a decision engine that measures and manages power and energy while guaranteeing performance. The grano.la software has been downloaded by about half a million users in more than 160 countries.

14. I also created the PowerPack power measurement software and hardware framework that provides scientifically sound fine-grain AC and DC power measurements of computer systems and their components. The PowerPack methodology influenced the design of the methodologies used today in the DOE Energy Star program for servers. Section 104 of the Energy Policy Act of 2005

requires federal government agencies to purchase ENERGY STAR-qualified systems when procuring compute servers. Though the exact figure is undisclosed for security and operational reasons, the number of U.S. government-owned compute servers is in the hundreds of thousands.

15. I am the recipient of numerous national and international awards for my work in power measurement and management. In addition to the National Science Foundation Career Award, in 2004 I was also awarded the prestigious Department of Energy Early Career Award. I was also awarded IBM and AMD Faculty Awards for my work with industry. For my corporate leadership as CEO and CTO of MiserWare, I was named Innovator of the Week by Bloomberg Businessweek Magazine.

16. My pioneering work led to an invitation to lead the NSF Technical Report "NSF Report on the Science of Power Management." This report resulted in several programs that provided millions in funding to energy efficiency work in NSF programs. My work consistently appears in major news media and has appeared in venues as varied as SXSW and the Smithsonian National Museum of American History in Washington, D.C.

17. I have published chapters in nine different textbooks. I have also published over 40 refereed journal publications and over 60 referred conference

papers, a more complete list of which is included in my CV. In addition to my publications, I have given numerous tutorials, talks, presentations, and lectures, in both academic and corporate settings, on electrical energy management.

18. I regularly supervise B.S., M.S., and Ph.D. students that upon graduation work in top tech companies. I teach classes at the undergraduate and graduate levels at Virginia Tech, where I ran the graduate program for a number of years. I regularly teach courses on computer systems and networking, energy efficiency, computer architecture, and parallel computation at the introductory and advanced levels.

III. PRIOR TESTIMONY

19. I have provided technical consulting to several clients in the electrical energy management field in regards to litigation focused on the tools, technologies, decision engines, and various other techniques for in-band and out-of-band energy measurement and management of electrical devices at the systems level. These cases were dismissed or settled before trial.

20. A list of all such cases in which I have consulted can be found in my CV.

IV. COMPENSATION

21. I am being compensated for my services in this proceeding. This

compensation is not contingent upon my performance, the outcome of this case, or any issues involved in or related to this case. I have no financial interest in this matter.

V. MATERIALS CONSIDERED

22. My opinions are based on my experience in this field, and are necessarily formed by my own experiences, materials I have read over the years, and discussions I have had with colleagues during my career. I have also considered the understanding of a person of ordinary skill ("POSITA") around the time of the invention of the '391 Patent. In addition, I have reviewed and considered the following materials in forming my opinion:

23. The '391 Patent (EX-1001);

24. U.S. Patent No. 5,596,258 to Kimura et al. ("Kimura") (EX-100)

25. U.S. Patent No. 5,650,710 to Hotta ("Hotta") (EX-1003)

26. U.S. Patent No. 5,659,240 to King ("King") (EX-1004)

27. U.S. Patent No. 5,696,367 to Keith ("Keith") (EX-1005)

28. U.S. Patent No. 5,548,200 to Nor et al. ("Nor") (EX-100)

29. File History of the '391 Patent (EX-1007);

- U.S. Patent No. 6,614,204 to Pellegrino et al. ("Pellegrino") (EX-1008)

30. SAE Standard J1772 (Revised Nov. 2001) (EX-1011)

31. October 17, 2024 Deposition Transcript of C. Arthur MacCarley, Ph.D. (EX-2007)

VI. UNDERSTANDING OF THE LAW

32. I am not an attorney. For the purposes of this declaration, Patent Owner's counsel has informed me about certain aspects of the law that are relevant to my opinions. I have applied those legal principles in arriving at my conclusions expressed in this declaration.

A. Claim Construction

33. I understand that the first step in performing a validity analysis of the patent claims is to interpret the meaning and scope of the claims by construing the terms and phrases found in those claims. I understand that a determination of the meaning and scope of the claims is a matter of law.

34. I have been informed that to determine the meaning of the claims, courts consider the intrinsic evidence, which includes the patent's claims, written description, prosecution history, materials incorporated by reference in the patent, and prior art cited in the patent or its prosecution history. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the content of the entire patent.

35. I have been informed that a patentee may also define his or her own

terms to disavow claim scope. Normally, embodiments and examples appearing in the specification will not generally be read into the claims. However, the intrinsic record may resolve ambiguous claims terms where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone. A term's context in the claims can also be helpful. Differences among the claim terms can also assist in understanding a term's meaning.

36. I have been informed that extrinsic evidence can also be useful in determining the meaning of claims, however, it is less significant than the intrinsic record. Technical dictionaries may be useful to show the way one skilled in the art might use claim terms, but technical dictionaries may provide definitions that are too broad or may not be indicative of how the term is used in the patent.

37. I understand that the claim terms of a patent are to be construed from the point of view of a hypothetical person of ordinary skill in the art (POSITA) in the time frame of the patent's priority date. At times I may refer to a person of skill in the art as simply "a skilled person".

B. Level of Ordinary Skill

38. For the purpose of assessing the level of ordinary skill of POSITA, I have considered the field of the invention, the prior art relevant to that field, and

the level of education and expertise of active workers in the field.

39. I understand that Petitioner has taken the position that a POSITA at the time of the invention of the ’391 Patent would have had a bachelor’s degree in computer science or electrical engineering, along with at least two to three years of experience working on software and/or hardware used to manage charging processes for electric vehicles, and that additional education could substitute for professional experience and vice versa. Additionally, it is my understanding Petitioner has taken the position that a POSITA would have been familiar with standards and regulations relevant to charging of electrical vehicles (including J1772, EX1011), as well as the principles and technologies that the ’391 Patent identifies as part of the general knowledge.

40. Based on my review of the ’391 Patent, and the references relied on by Petitioner, I believe that Petitioner’s definition of a POSITA is too narrow. While I agree that a POSITA would have had a bachelor’s degree in computer science or electrical engineering, along with at least two to three years of experience, and I also agree that additional education could substitute for professional experience and vice versa, I disagree that the experience need be limited to working on software and/or hardware used to manage charging processes for electric vehicles. In my opinion, since the ’391 Patent is focused on

data processing concepts such as execution engines, interrupt monitors, and data services for managing an energy transaction, at least two to three years of experience working on data processing systems in the field of energy management would have been sufficient. My opinion is supported by the '391 Patent, which describes the invention as being "related generally to an improved *data processing system*, and in particular, to a method and apparatus for *managing* electric vehicle charging transactions." (EX1001 at 1:8-11 (emphasis added); *see also* 2:38-48, 3:62-65 (referring to data processing environments in which embodiments may be implemented); 5:16-18 (referring to a data processing system in which illustrative embodiments may be implemented). Indeed, the '391 Patent makes it clear that the invention is not directed to electric vehicles or charging stations themselves. (*Id*. at 4:24-26, 37-39.)

41. For similar reasons, it is my opinion that a POSITA would not require knowledge of standards and regulations relevant to charging of electrical vehicles (including J1772, EX-1011). My opinion is further reinforced by the fact that standards and regulations such as J1772 are not mentioned anywhere in the '391 patent.

42. Should the Board adopt Petitioner's level of ordinary skill of a POSITA, I meet that definition of a POSITA based upon my education and

experience.

C. Legal Standards for Prior Art

43. I understand that a patent or other publication must first qualify as prior art before it can be used to invalidate a patent claim.

44. I understand that a U.S. or foreign patent qualifies as prior art to an asserted patent if the date of issuance of the patent is prior to the invention of the asserted patent. I further understand that a printed publication, such as an article published in a magazine or trade publication, qualifies as prior art to an asserted patent if the date of publication is prior to the invention of the asserted patent.

45. I understand that a U.S. or foreign patent also qualifies as prior art to an asserted patent if the date of issuance of the patent is more than one year before the filing date of the asserted patent. I further understand that a printed publication, such as an article published in a magazine or trade publication, constitute prior art to an asserted patent if the publication occurs more than one year before the filing date of the asserted patent.

46. I understand that a U.S. patent qualifies as prior art to the asserted patent if the application for that patent was filed in the United Stated before the invention of the asserted patent.

D. Legal Standards for Anticipation

47. I have been informed by counsel and understand that to anticipate a patent claim, all of the requirements of that claim must be shown to be present in a single previous device or method that was known of, used, or described in a single previous printed publication or patent. Anticipation should be assessed on a claim-by-claim basis. I also understand that anticipation can occur when an undisclosed limitation is literally missing but is present because the prior art must necessarily function in accordance with, or include, the undisclosed limitation.

48. I have further been informed that only a single reference should be relied upon to anticipate a claim unless any further references are cited solely to:

a. prove that the primary reference contains an "enabled disclosure;"
b. explain the meaning of a term used in the primary reference; or
c. show that a characteristic not disclosed in the reference is inherent.

49. I understand that to anticipate a claim, the prior art does not need to use the same words as the claim, but all the requirements of the claim must have been disclosed, either stated expressly or implied to a person having ordinary skill in the art in the technology of the invention.

50. I understand that for a reference to anticipate a patent claim, that

reference must also enable one of ordinary skill in the art to make and use the full scope of the claimed invention without undue experimentation.

51. I understand that documents and materials that qualify as prior art can be used to invalidate a patent claim via anticipation or obviousness.

52. I understand that, once the claims of a patent have been properly construed, the second step in determining anticipation of a patent claim requires a comparison of the properly construed claim language to the prior art on a limitation-by-limitation basis.

53. I understand that a prior art reference "anticipates" an asserted claim, and thus renders the claim invalid, if all elements of the claim are disclosed in that prior art reference, either explicitly or inherently (i.e., necessarily present).

54. I understand that anticipation in an *inter partes* review must be shown by a preponderance of the evidence, which is a higher standard than the reasonable likelihood required to institute an *inter partes* review.

E. Legal Standard for Obviousness

55. I have been informed by counsel and understand that even if a patent is not anticipated, it is still invalid if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person of ordinary skill in the

art.

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

57. I also understand that an obviousness determination includes the consideration of various factors such as:

a. the scope and content of the prior art,

b. the differences between the prior art and the asserted claims,

c. the level of ordinary skill in the pertinent art, and

d. the existence of secondary considerations such as commercial success, long-felt but unresolved needs, failure of others, etc.

58. I understand that an obviousness evaluation can be based on a combination of multiple prior art references. I understand that the prior art references themselves may provide a suggestion, motivation, or reason to combine, but other times the nexus linking two or more prior art references is just common sense. I further understand that obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may be supplied by the direction of the

marketplace.

59. I understand that if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

60. I also understand that practical and common-sense considerations should guide a proper obviousness analysis, because familiar items may have obvious uses beyond their primary purposes. I further understand that a person of ordinary skill in the art looking to overcome a problem will often be able to fit together the teachings of multiple publications. I understand that obviousness analysis therefore considers the inferences and creative steps that a person of ordinary skill in the art would employ under the circumstances.

61. I understand that a particular combination may be proven obvious merely by showing that it was obvious to try the combination. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp because the result is likely the product not of innovation but of ordinary skill and common sense.

62. The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, the patent claim is likely obvious.

63. It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

64. I understand that a claim can be obvious through consideration of a single reference, without the need to combine references, if the elements of the claim that are not found explicitly or inherently in the reference can be supplied by the common sense of one of skill in the art.

65. Further, I understand that for an obviousness challenge based on a single reference in view of the knowledge and skill of a POSITA, there must be a motivation to make the combination and a reasonable expectation that such a combination would be successful, otherwise a skilled artisan would not arrive at

the claimed combination. In other words, when a gap in a single prior art reference requires filling with, for example, the POSITA's knowledge, there must be a further showing that the POSITA would have arrived at the claimed invention.

66. I understand that contemporaneous and independent invention by others is another consideration supporting an obviousness determination.

67. In summation, my understanding is that prior art teachings are properly combined where a person of ordinary skill in the art having the understanding and knowledge reflected in the prior art and motivated by the general problem facing the inventor, would have been led to make the combination of elements recited in the claims. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of multiple prior art references in the claimed manner.

68. I understand that obviousness in an *inter partes* review must be shown by a preponderance of the evidence, which is a higher standard than the reasonable likelihood standard for instituting *inter partes* review.

VII. CLAIM CONSTRUCTION

A. Data Services Interruption

69. The patentees acted as their own lexicographers in defining the term

"data services interruption" recited in claims 1, 6, 8, 13, 15, and 20 of the '391 patent. (*E.g.*, Ex. 1001 at 16:56.) Specifically, the patentees disclosed in the specification that a data services interruption:

> ***is a set of one or more interruptions caused by the inability for information to be exchanged with data services sources***. Data service sources are sources of data, such as, for example, energy data services 308 in FIG. 3. Data services interruption 506 may be caused by power outages, broken transmission lines, or any other problems preventing a data service from exchanging information with other components of an electric vehicle transaction infrastructure.

(Ex. 1001 at 13:38-46 (emphasis added).)[1] Further, the specification stresses that:

> Energy data services 308 are a set of one or more ***third party data sources*** providing information relevant to the energy transaction. Energy data services 308 may include, without limitation, weather information sources, traffic information sources, map and travel information sources, charging station price information sources, or any other third party information sources.

(*Id.* at 8: 38-44.)

70. Accordingly, the term "data services interruption" should be construed as "a set of one or more interruptions caused by the inability for information to be exchanged with a set of one or more third party data sources providing information relevant to the energy transaction," where the term "third party" means "an entity or person that is not a party to the electric vehicle charging

[1] Unless specified otherwise, all emphasis is added throughout this Brief.

transaction." (*See id.* 7:41-47.) Examples of data sources include, without limitation, weather information sources, traffic information sources, map and travel information sources, charging station price information sources, or any other third party information sources. (*Id.* at 8: 40-44.)

71. By defining the term "data services interruption" in this way, the inventors disavowed claims covering intra-system communications abnormalities, such as communication failures between the battery and the charging station. (*See* Pet. at 28.) Petitioner's expert Dr. MacCarley failed to consider the definition in the '391 patent and instead devised his own (wrong) definitions—

- "the plain and ordinary interpretation of that would be some disruption of normal data ***communication from one entity to another or to multiple other targets***." (Ex. 2007 at 34:21-25.)
- "There is a data services interruption, which would be monitoring the operational parameter—the operational state of data communication either between the ***two units, the execution engine and the interrupt monitor***, or external infrastructure events. They allow in the text." (*Id.* at 27:23–28:4.)
- "broader class of data services interruption" (*id.* at 70:5-6.)

72. Dr. MacCarley's definitions are wrong because it is he—and not the '391 patent—who considers data services interruptions a "broader class" encompassing "***multiple*** . . . targets." And the relevant communication cannot be between the energy transaction execution engine (ETEE) and energy transaction interrupt monitor (ETIM) because both are intra-system units and not third-party data

sources. Accordingly, Dr. MacCarley's testimony on this term should be given no weight.

73. PO's proposed construction is also consistent with the Detailed Description of the Invention of the '391Patent, in which Data services interruption is described in terms of interruptions of third party communications. (Ex. 1001 at 13:42-43; *see also, e.g., id.* at 8:40-44, 2:5-14, 10:35-38, 10:51–11:17, 13:37-46, 14:41-56; *id.* figs. 4-7.)

B. "Manual Override Interruption"

74. The patentees acted as their own lexicographers in defining the term "manual override interruption" recited in claims 2, 9, and 16 of the '391 patent. The specification discloses that:

> Manual override interruption 422 is ***an instruction*** that causes energy transaction execution engine 416 to terminate charging process 404. User 420 may generate manual override interruption 422 by interacting with a user interface located at the charging station or on the electric vehicle. In addition, user 420 may generate manual override interruption 422 at a remote location by implanting a user interface presented on a remote computing device. For example, user 420 may utilize a cell phone or computer for accessing a user interface for generating manual override interruption 422.

(Ex. 1001 at 12:26-36.) "User 420 may terminate charging process 404 by generating manual override interruption 422." (*Id.* at 12: 24-26.)

The specification also discloses in Figure 7 that a received manual override notification may be identified as an interruption (steps 72 and 704):

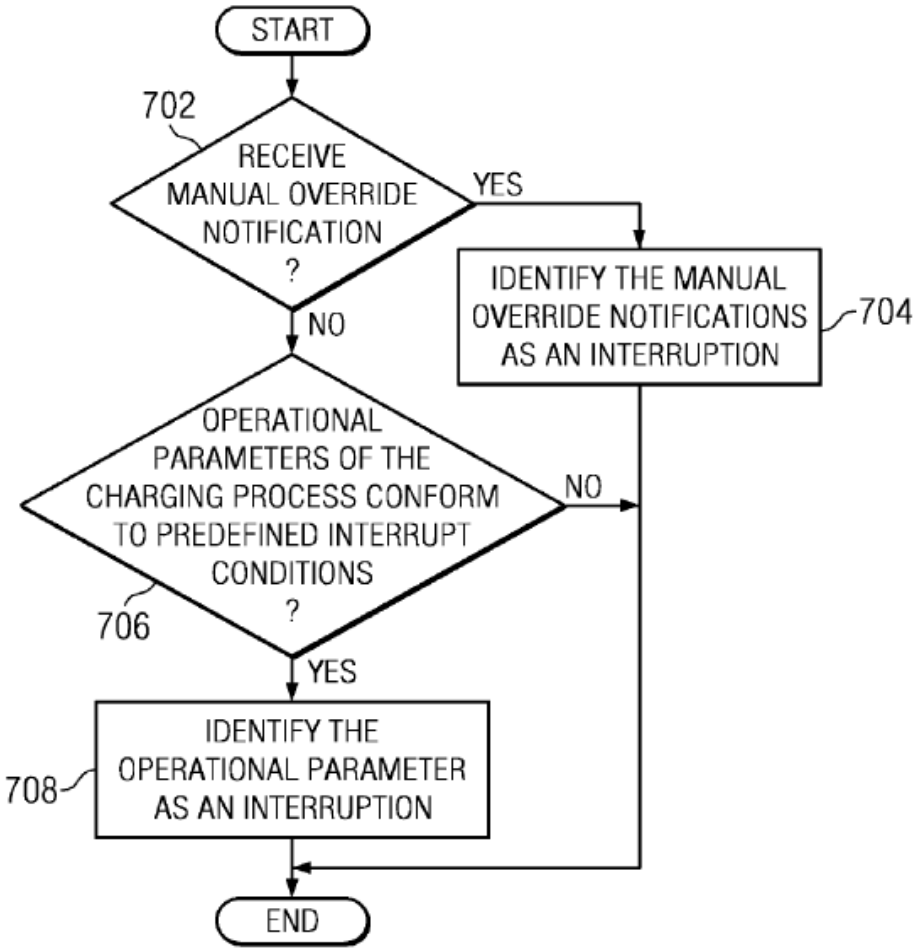


FIG. 7

(*Id.* fig.7.)

75. A POSITA would understand "instruction" as that term is used in the '391 patent to mean an encoding of a series of operational steps specifying the details to be executed according to those operational steps. Thus, an instruction is a digital

operation that sends a series of signals and goes beyond the mechanical operation of pressing a button on a keyboard.

76. Accordingly, the term "manual override interruption" should be construed as "an instruction that causes energy transaction execution engine to terminate the charging process, which a user may generate during the flow of electricity by interacting with a user interface," where "instruction" means "an encoding of a series of operational steps specifying the details to be executed according to those operational steps."

77. By defining the term in this way, the patentees disavowed claims covering mere opening and closing of a switch. Dr. MacCarley's opinions on construction of the "manual override interruption" should be given no weight because he defined it as "a human being or ***some external, decision-making entity*** providing an input to the system that would lead to the interruption, the termination, of the charging process." (Ex. 2007 43:11-16.) His definition is inappropriately broad, and should be accorded little weight, because it does not require generating an instruction and conflates input from an external decision-making entity with user-generated input.

78. On the other hand, PO's proposed construction is consistent with the Detailed Description of the Invention of the '391 patent. (Ex. 1001 at 12:26-45; *id.* figs. 4-7.)

C. "Preference Interruption"

79. The patentees acted as their own lexicographers in defining the term "preference interruption" recited in claims 1, 5, 8, 12, 15, and 20 of the '391 patent. The specification discloses that:

> Preferences interruption 504 is a set of one or more interruptions that are caused from a violation of a ***user-specified*** preference. The user-specified preference may be, for example, a preference specified by an owner or operator of an electric vehicle or a utility provider. Thus, a user may specify a preference for a threshold cost for charging an electric vehicle. If the cost of charging the electric vehicle during a charging process exceeds the user cost preference, then an energy transaction interrupt monitor identifies the cost as preference interruption 504. Other parties may also specify preferences, the violation of which results in identification of preference interruption 504. Preferences for the user or third parties may be set in an energy transaction plan or stored in a data storage device accessible to the energy transaction interrupt monitor.

(Ex. 1001 at 13:22-36.) Accordingly, the term "preference interruption" should be construed as "a set of one or more interruptions that are caused from a violation of a user-specified preference."

80. By defining the term "preference interruption" in this way, the inventors disavowed claims covering, among other things, factory presets, which are not user-specified. (*See* Pet. at 27; Ex. 1001 at 6:62–7:2.) Petitioner's expert Dr. MacCarley failed to consider the definition in the '391 patent and instead devised his own (wrong) definitions—

> There is a preference interruption, which is somewhat broadly defined ***as an externally settable parameter*** either by the user or ***by some external parameter setting input*** that has been violated or is altered or for whatever other reason needs to be monitored and could potentially indicate that termination of charging is appropriate.

(Ex. 2007 at 28:9-16.)

> [T]o answer your question, preference interruption would be a ***violation of either some threshold or some state***, both of those being compared with an operational parameter input that, if that difference occurs—if, say, a threshold is exceeded or a state is violated, put into something other than what was preferred when the preference was set up, that would constitute an event worthy of generating an interruption of charging.

(*Id.* at 33:17–34:3.) Dr. MacCarley's definition is wrong, and should be accorded little weight, at least because it is too broad in that it covers factory presets, which are not user-specified, and is not limited to violations of the preference.

81. PO's proposed construction is also consistent with the Detailed Description of the Invention of the '391 patent, which explains that in one exemplary embodiment,

> a user may specify a preference for a threshold cost for charging an electric vehicle. If the cost of charging the electric Vehicle during a charging process *exceeds* the user cost preference, then an energy transaction interrupt monitor identifies the cost as preference interruption 504.

(Ex. 1001 at 13:28-31; *see also, e.g.*, *id.* at 2:5-14, 10:51–11:17, 13:21-36, 14:41-56; *id.* figs. 4-7.)

VIII. OVERVIEW OF THE '391 PATENT AND THE CITED ART

A. The '391 Patent

82. The ’391 Patent, entitled “System for Detecting Interrupt Conditions During an Electric Vehicle Charging Process,” has a priority date of August 19, 2008, and relates to a data processing system and method for managing a charging process of an electric vehicle (EV). (EX-1001 at 1:8-11.)

83. EVs contain electric storage mechanisms, such as batteries, that store electricity for when power is needed. (*Id*. at 1:27-29.) In order for an EV to continue operating, the storage mechanism requires charging to replenish the depleted electric charge. (*Id*. at 1:29-31.) One way to provide charging is through an “off-vehicle” charging station that provides an external source of electricity. *Id*. at 1:40-44).

84. At the time, EV manufacturers and electric utility companies had only planned and provided infrastructure for the most rudimentary charging scenarios, such as merely plugging the electric vehicle into a common electric outlet that was owned by the owner and operator of the electric vehicle. (*Id*. at 6:60-65.) However, the inventors recognized that EV charging would frequently be conducted under much broader and more complex sets of circumstances, such as might occur when charging an EV at an off-vehicle charging station owned by somebody other than the vehicle owner, and under such circumstances the charging transactions by which EVs obtained electricity from such an off-vehicle charging station “requires

a much more complete, flexible, and interoperable system governing all aspects of the charging transaction." (*Id*. at 6:65 - 7:16.)

85. The inventors divided the charging transaction into three aspects or phases: the pre-charge phase, the charge phase, and the post-charge phase. (*Id*. at 7:17 - 7:19.) In the pre-charge phase, "all parties are presented with conditions governing the charging transaction." (*Id*. at 7:19 - 7:21.) In the charge phase, "[e]lectricity flows to the EV and payment is made." (*Id*. at 7:21-22[2].). Additionally, during the charge phase, one or more operational parameters that conform to predefined interrupt conditions are monitored and, if one or more interrupt conditions are identified, then the charging process is terminated. (*Id*. at 10:8-12, 14:1-5).

86. Interruptions may include a device capability interruption, a preference interruption, or a data services interruption. (*Id*. at 11:12-17.) Device capabilities interruptions originate from component of the electric vehicle energy transaction infrastructure, (*Id.* at 13:10-20), preference interruptions are caused by

[2] While the specification says "post-charge" phase here, a POSITA would understand from the context, and other parts of the specification (e.g., EX-1001 at 8:60-9:32), that the inventors meant "charge" phase.

violation of a user-specified preference, (*Id.* at 13:21-36), and data services interruptions are caused by the inability for information to be exchanged with third party data services sources, (*Id.* at 13:37-46, 8:38-44). Additionally, a user may terminate the charging process by generating a manual override interruption, which is an instruction generated by the user with a user interface. (*Id*. at 12:24-36.) In the post-charge phase, "an analysis is performed to provide incentives and induce specific behaviors on the part of any party involved in the transaction." (*Id*. at 7:22-25.)

87. Figure 3 of the '391 Patent (reproduced below) shows an embodiment of an electric vehicle energy transaction infrastructure for managing all phases of the charging transaction—i.e., the pre-charge phase, the charge phase, and the post-charge phase. (*Id*. at 7:30-34.) Components of the electric vehicle energy transaction infrastructure, such as the energy transaction execution engine, the energy transaction interrupt monitor, and the integration and service bus (which allows components of the data processing system to communicate and transfer data), may be implemented on a data processing system. (*Id*. at 7:34-40, 9:61-64.) The data processing system may be a network data processing system (e.g., as depicted in Figure 1 of the '391 Patent) with one or more servers and one or more clients connected to a network (such as the Internet), (*Id*. at 4:3-23, 5:1-15), or the

data processing system may be a computer, such as a server or client depicted in Figure 1 of the '391 Patent, (*Id*. at 5:16-24). Operations of the energy transaction interrupt monitor are illustrated in the flowcharts shown in Figures 6 and 7. (*Id*. at 13:47-51, 14:17-21.) Each block or combination of blocks in the flowcharts can be implemented by computer program instructions (i.e., program code). (*Id*. at 3:33-37.) A data processing system suitable for storing and/or executing program code will include at least one processor coupled to memory elements through a system bus. (*Id*. at 16:13-16.)

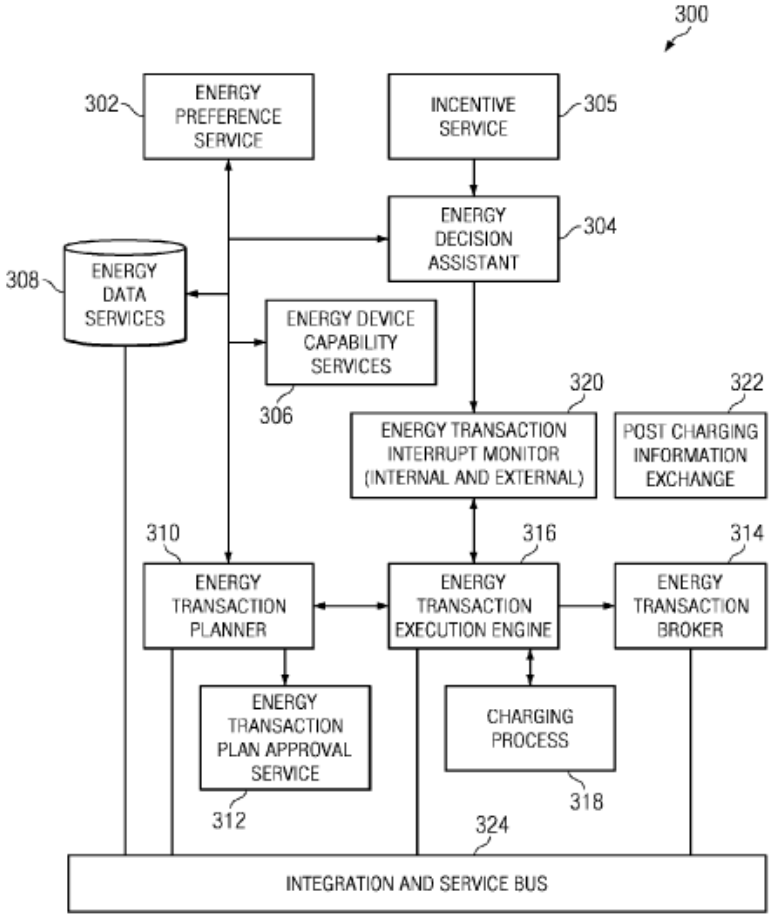


FIG. 3

88. If one of more of the components are located remotely, they may transfer data using a wired network connection or a wireless network connection such as a cell-phone network, satellite, two-way radio, WiFi networks, or any other type of wireless network. (*Id*. at 10:1-7.)

89. Components of an illustrative data processing system are shown in Figure 4 of the ’391 patent (reproduced below). (*Id*. at 10:51-54.) Data processing system 400 includes transaction interrupt monitor 402 that monitors a

charging process 404 for interruptions 406 after receiving a request to start monitoring a charging process. (*Id*. at 10:51-11:9; 13:52-53; Figure 6.) As noted previously, interruptions 406 may include a device capability interruption, a preference interruption, or a data services interruption, or any combination thereof. (*Id*. at 10:35-40.) Energy transaction interrupt monitor 402 identifies interruptions 406 from operational parameters 408 by identifying the operational parameters from operational parameters 408 that conform to predefined interrupt conditions 412. (*Id*. at 11:39-44.) If an interruption is identified, then the process sends a response to the energy transaction execution engine to terminate the charging process. (Id. at 14:1-5).

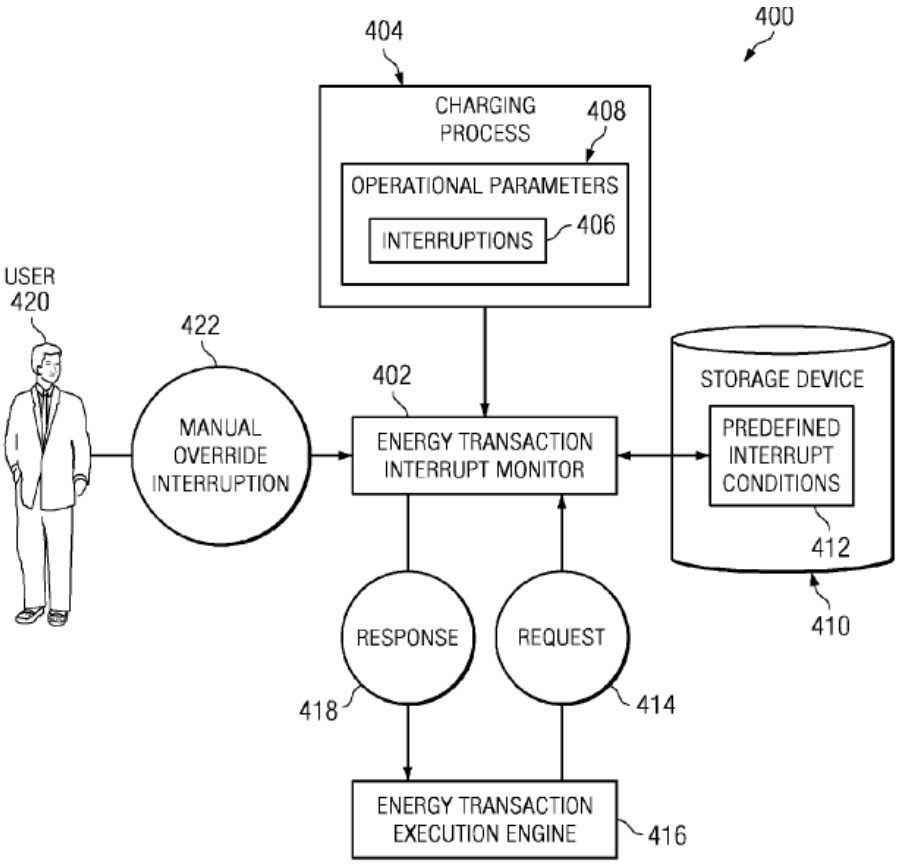


FIG. 4

90. Figure 6 of the ’391 Patent (reproduced below) is a flowchart showing a process for managing a charging process of an EV according to an illustrative embodiment. (*Id*. at 13:47-49.)

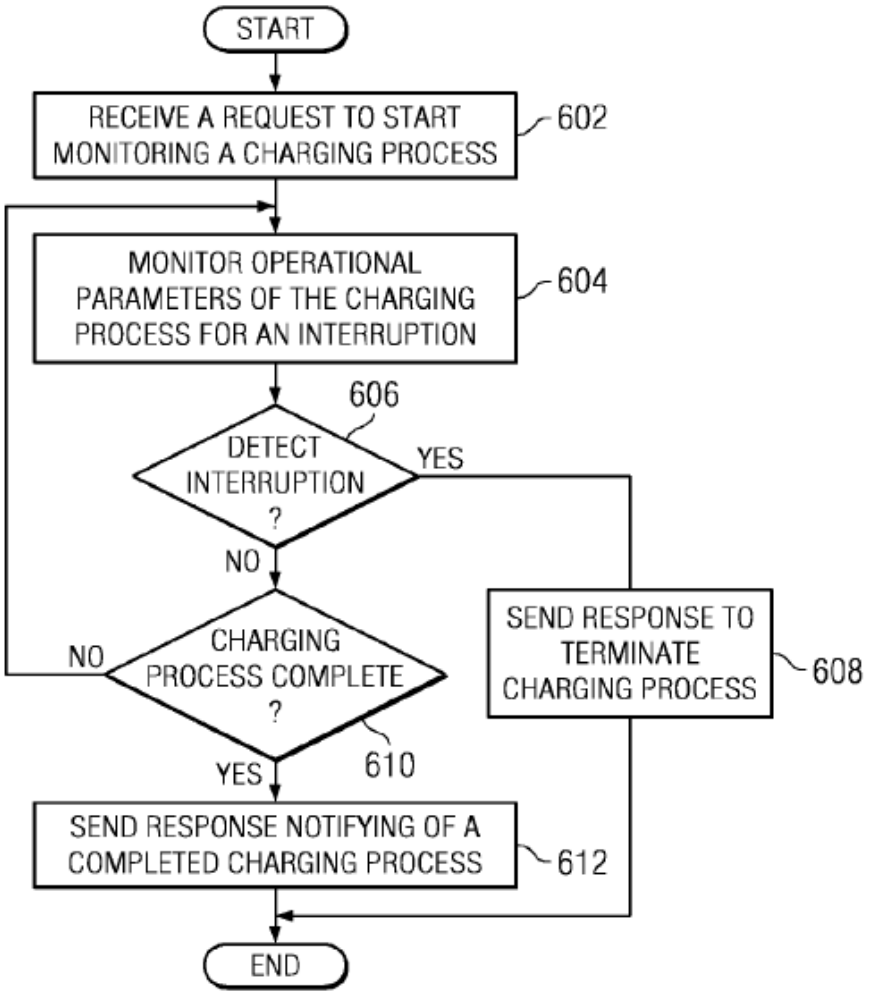


FIG. 6

91. As noted previously, when a request to start monitoring a charging process is received, operational parameters of the charging process are monitored for an interruption. If an interrupt condition is detected, the process sends a response to terminate the charging process. For example, if pricing for energy were to exceed a predefined threshold in violation of a user-selected preference, the monitor detects this interrupt condition and initiates appropriate actions to

terminate the electric power flow to the electric vehicle. (*Id*. at 9:15-20.) Alternatively, power could be supplied to the grid during times of high prices from stored energy within the vehicle. (*Id*. at 4:48-57.) Furthermore, termination of the charging process because of detecting interruptions may insure that the charging process proceeds according to the terms and conditions that were established by parties to the charging process. (*Id*. at 14:62-65.)

IX. OPINION

A. THE CITED ART DOES NOT ANTICIPATE OR RENDER OBVIOUS THE CHALLENGED CLAIMS

1. Ground 1: Kimura Does Not Render Obvious Claims 1, 4-8, 11-15, and 18-20

2. Claim 1[1]

92. Claim 1 recites, in relevant parts of elements 1[a] and 1[d], respectively, "responsive to receiving, from an energy transaction execution engine, ***a request signaling a start*** of the charging process . . . ," and "responsive to detecting the one or more interruptions, sending ***a response*** to the energy transaction execution engine ***to terminate*** the charging process."

93. Both the "request signaling a start" and "response . . . to terminate" recited in claim 1 must be messages. The specification explains, among other things, that

1. "Request 414 is a message signaling the start of charging process 404." (Ex. 1001 at 12:3-4.)
2. "Request 414 informs energy transaction interrupt monitor 402 that charging process 404 has begun." (*Id.* at 12:48-49.)

3. "Response 418 is a message that may instruct energy transaction execution engine 416 to terminate charging process 404." (*Id.* at 12:12-14.)

94. Petitioner failed to show that Kimura renders claim 1 obvious because Kimura does not teach or suggest these limitations. Instead, Kimura discloses use of output start charge signals/input start charge signals (Pet. at 13 (citing Ex. 1002 figs. 10A & 12)) and output charge inhibit signal (Pet. at 32 (citing Ex 1002 at 11:30-33).) In a data processing system, a message is a unit of data or information sent from one device to another that includes a header and a body. Use of signals is characteristic of rudimentary energy transactions which are disparaged in the '391 patent (*e.g.*, Ex. 1001 at 6:65–7:2) and is not suitable for more complex, flexible, and interoperable systems and methods disclosed in the '391 patent:

> The illustrative embodiments recognize that the charging transactions by which electric vehicles obtain electricity from an off-vehicle charging station to charge the electric vehicle requires a much more complete, flexible, and interoperable system governing all aspects of the charging transaction.

(*Id.* at 7:12-16.) Petitioner has not provided any evidence to suggest it would have been obvious to use messages instead of signals in Kimura. Therefore, Kimura does not render claim 1 obvious.

4. **Claim 4**

95. Claim 4 depends from claim 1. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 4 is not rendered obvious by Kimura for at least all of the reasons discussed above with regard to claim 1 in Section VI.A *supra*.

5. **Claim 5**

96. Claim 5 recites, in relevant part "wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process." Petitioner argues that Kimura renders claim 5 obvious because it discloses voltage reaching a predetermined target value. (Pet. at 38.)

97. Petitioner fails to meet his burden as to claim 5. As explained above, the term "preference interruption" means "a set of one or more interruptions that are caused from a violation of a user-specified preference." (*Supra* Part V.C.) Furthermore, claim 5 recites that the preference must be selected by a participant to the charging process. The terms "party" and "participant" are used interchangeably in the '391 patent. (Ex. 1001 at 14:64-65 ("the terms and conditions that were established by

parties to the charging process."); *id.* at 7:41-53 ("parties of the transaction").) The parties may include "the owner of the electric vehicle to be charged, the operator of the electric vehicle, the owner of the charging station, and an electric utility company providing electricity to an electric power grid associated with the charging station." (*Id.* at 7:43-49.) Further, under the '391 patent, the parties must agree to conditions relevant to their role in the transaction prior to the charge commencing, "***[d]uring the pre-charge phase***." (*Id.* at 7:49-53 & 7:39.)

In Kimura, the voltage threshold on which Petitioner relies must be preset at the factory because it is saved in EEPROM memory and there is no teaching or suggestion of a user interface that would permit alteration of the preset:

> it is necessary to stop charging when a target value of the terminal voltage during the charging operation is set according to the type of the battery and the terminal voltage reaches this target value.
>
> A current instruction value I and the ***voltage target value V*** in the constant current charge mode ***are previously stored in an EEPROM (Electrically Erasable Programmable Read Only Memory)*** (not shown) of the battery controller 14 according to the type of the battery 11 to be installed in the electric vehicle 10.

(Ex. 1002 at 5:24-34.) There is no indication in Kimura that the factory setting the preset is a user or a participant as that term is used in the '391 patent. Also, because there is no user-interface or other programming means available to the user, the pre-installed voltage target values stored in the EEPROM cannot be changed by the user and are therefore cannot be user-specified preferences. At the same time, because a factory preset is a given, the actual participants cannot meaningfully agree to it. (See id. 7:49-53 & 7:39.)

6. **Claim 6**

98. Claim 6 recites: "The computer implemented method of claim 1, wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission." (Ex. 1001 at 17:12-16.) As explained above, the term "data services interruption" should be construed to mean, among other things, an interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Part V.A; Ex. 1001 at 13:38-46; *id.* at 8: 38-44.)

99. Kimura cannot render claim 6 obvious because nowhere does it teach or suggest a data services interruption caused by the inability of information exchange with ***third*** party data sources. Petitioner asserts a sole argument that a data services interruption in Kimura "occurs when the charger controller 24 fails to communicate with the battery controller 14 within a predetermined amount of time

(S47-Yes and S49, orange). Ex-1002, 10:41-44." (Pet. at 40.) However, Kimura's charger controller and battery controller are not part of third party structures / services—Kimura explains that the "charger controller 24" and the "battery controller 14" are part of "a preferred embodiment of a charging apparatus for an electric vehicle" depicted in Kimura's Figure 1. (Ex. 1002 at 3:6-7; *see also id.* at 3:7-48.)

(*Id.* fig.1.) Additionally, Kimura discloses that control lines 33 through 36 are control lines to transmit various control signals between the battery controller 14 of the electric vehicle 10 and the controller 24 of the charger 20, without any involvement of third parties. (*Id.* at 3:49-52.)

Furthermore, Kimura's charger controller and battery controller are directly connected via a physical cable. (*Id.* at 3:30-33; *id.* at 3:9-11.) One of Kimura's control lines 33 is exclusively used to transmit a charge start signal and a stop signal from the charger 20 to the electric vehicle 20; another control line 34 is exclusively used to transmit a charge enable signal and an inhibit signal from the electric vehicle 10 to the charger 20). Accordingly, Petitioner failed to show obviousness of claim 6.

100. Petitioner's claim 6 argument is based on the opinions of its expert Dr. MacCarley. (*See* Pet. at 40-41 (citing Ex. 1009,¶¶ 104-106).) However, Dr.

MacCarley apparently was unaware of how the patentees defined a data services interruption in the '391 patent and opined that it is "some disruption of normal data communication from one entity to another or to multiple other targets." (EX2007 at 34:22-25.) Therefore, his opinions on this issue should be accorded little weight.

7. Claim 7

101. Claim 7 recites, in relevant part, "wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions." Petitioner failed to meet its burden as to claim 7 because it failed to show "detecting by identifying an operational parameter from the set of operational parameters" in Kimura.

102. A POSITA would understand claim 7 to mean that an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions is identified before each new charging transaction. A POSITA would further understand that the '391 patent teaches more flexible and interoperable systems and methods, divided into three phases: pre-charge, charge, and post-charge. After a previous charging transaction is completed, in the pre-charge phase of a new charging transaction, a user may change an interrupt condition involving one or more operational parameters.

103. The ’391 patent’s specification also supports this understanding when it discloses that

> The illustrative embodiments recognize that the charging transactions by which electric vehicles obtain electricity from an off-vehicle charging station to charge the electric vehicle ***requires a much more complete, flexible, and interoperable system*** governing all aspects of the charging transaction. Electric vehicle charging transactions can be divided into the pre-charge phase, the charge phase, and the post-charge phase. ***During the pre-charge phase of decision enablement, all parties are presented with the conditions governing the charging transaction.*** Electricity flows to the electric vehicle and payment is made during the post-charge phase. Finally, during the post-charge phase of the transaction, an analysis is performed to provide incentives and induce specific behaviors on the part of any party involved in the transaction.

(Ex. 1001 at 7:12-25.) The conditions governing the transaction include predefined interrupt conditions, which include rules involving operational parameters. The operational parameters in the predefined interrupt conditions are the set of

operational parameters from which the method identifies operational parameters to monitor.

104. Petitioner argues only that Kimura meets the limitations of this claim because it discloses that "the battery controller 14 detects that the voltage of the battery 11 (operational parameter) conforms to a predetermined voltage threshold (predefined interrupt)." (Pet. at 42.) However, Petitioner does not explain how Kimura's battery controller "detect[s] by identifying" voltage as an operational parameter from a set of operational parameters conforming to predefined interrupt conditions. On the contrary, Petitioner cites to no disclosure in Kimura where an operational parameter is identified from a set of operational parameters—it simply alleges that it is.

105. Furthermore, a predetermined voltage threshold is a factory preset that cannot be changed in the pre-charge phase of a charging transaction, as required in the '391 patent.

> During the pre-charge phase, all parties of the transaction are presented with the conditions governing the charging transaction. The parties may include, without limitation, the owner of the electric vehicle to be charged, the operator of the electric vehicle, the owner of the charging station, and an electric utility company providing electricity

> to an electric power grid associated with the charging station. Parties agree to conditions relevant to their role in the transaction prior to the charge commencing.

(*Id.* at 7:41-49.)

8. **Claim 8**

106. Claim 8 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.A.1.)

9. **Claim 11**

107. Claim 11 depends from independent claim 8. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 11 is not rendered obvious by Kimura for at least all of the reasons discussed above with regard to claim 8 in Part VI.A.6 *supra*.

10. **Claim 12**

108. Petitioner does not provide separate arguments for claim 12. (Pet. at 46.) Because claim 12 recites, in relevant part "wherein the one or more interruptions is the ***preference interruption***, and the preference interruption is detected from a violation of a preference ***selected by a participant to the charging process***[,]" Kimura does not render it obvious for the same reasons as with claim 5. (*Supra* Part VI.A.3.)

11. **Claim 13**

109. Claim 13 recites: "The computer program product of claim 8, wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission." (Ex. 1001 at 18:1-4.) With claim 13, Petitioner merely argues that "Claims 11-14 are analogous to Claims 4-7, so Claims 11-14 are rendered obvious by Kimura for analogous reasons . . . ." (Pet. at 46.) Accordingly, Petitioner failed to show obviousness of claim 13 at least for the same reason as with claim 6—namely, that Kimura does not teach or suggest a data services interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Parts V.A & VI.A.4.)

12. **Claim 14**

110. Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 46), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.A.5.)

13. **Claim 15**

111. Claim 15 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.A.1.)

14. **Claims 18**

112. Claim 18 depends from independent claim 15. A dependent claim contains

all of the limitations of the claim or claims from which it depends. Therefore, claim 18 is not rendered obvious by Kimura for at least all of the reasons discussed above with regard to claim 15 in Part VI.A.11 *supra*.

15. **Claim 19**

113. Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 49), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.A.5.)

16. **Claim 20**

114. Claim 20 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.A.1.)

[1] Contrary to the Board's view, PO does not concede that claim 1 or any other challenged claims are representative. (ID at 22.)

3. Ground 2: Kimura in View of Hotta Does Not Render Obvious Claims 2, 5, 9, 12, and 16

4. Claim 2

115. Claim 2 recites:

> The computer implemented method of claim 1, wherein the one or more interruptions is a manual override interruption, and wherein the computer implemented method further comprises:
>
> responsive to receiving, from a user, the manual override interruption, terminating the charging process.

(Ex. 1001 at 16:60-65.) As discussed above, the term "manual override interruption" should be construed as "an instruction that causes [ETEE] to terminate charging process, which a user may generate by interacting with a user interface." (*Supra* Part V.B.)

116. Petitioner argues that a combination of Kimura and Hotta renders claim 2 obvious. (Pet. at 54-57.) As an initial matter, Petitioner provides substantive arguments only in relation with Hotta. (*Id.* at 54-56.) For Kimura, it provides nothing more than a conclusory and unsubstantiated argument that "pressing Kimura's main switch that functions as taught for Hotta's stop command key" (*id.* at 57), thus this argument should be disregarded.

117. Petitioner failed to show that Hotta teaches or suggests this limitation for three reasons. ***First***, Hotta does not teach a manual interruption that is an instruction. Rather, it teaches manually pressing the charging stop command key:

"The storage battery starts being charged when the charging start command key is ***manually pressed***, and the charging of the storage battery is stopped when the charging stop command key is manually pressed." (Ex. 1003 at 1:22-26.) No evidence has been presented that pressing the key equates to an instruction as claimed. Thus, Petitioner's argument based on the charging stop command key (Pet. at 55) fails.

118. ***Second***, Figures 11-12 and 15-16 of Hotta, on which Petitioner relies (Pet. at 55-57) two-stage charging subroutines different from both the '391 patent and Kimura:

> ***FIGS. 9 through 12*** show a subroutine of a sequence for a two-stage constant-current/constant-current charging mode in which the subroutine of the sequence for setting a charging start time corresponds to a two-stage constant-current/constant-current charging mode. ***FIGS. 13 through 16*** show a two-stage charging mode with a constant current at a first stage and a constant voltage at a second stage, in which the subroutine of the sequence for setting a charging start time corresponds to a two-stage constant-current/constant-voltage charging mode.

(Ex. 1003 at 13:38-47; *see also id.* 3:12-17.) Despite of these fundamental differences, Petitioner failed to explain how and why a POSITA would combine Kimura and Hotta at least with respect to claim 2, thus it failed to show that a POSTA would be motivated to combine Kimura and Hotta or would have a reasonable expectation of success.

119. ***Third***, Dr. MacCarley's opinions regarding claim 2 should be given no weight. To begin, Dr. MacCarley defined "manual override interruption" as "a human being or ***some external, decision-making entity*** providing an input to the system that would lead to the interruption, the termination, of the charging process." (Ex. 2007 43:11-16.) This contradicts both the express language of claim 2 reciting, in relevant part, "receiving, ***from a user***, the manual override interruption"; and the patentees' definition.

120. Additionally, Dr. MacCarley's opinions on SAE J1772 (Ex. 1009, ¶154) should be disregarded because they were excluded from the Petition, and because arguments incorporated by reference into the Petition are not allowed. See 37 C.F.R. § 42.6(a)(3) ("Arguments must not be incorporated by reference from one document into another document.").

5. Claim 5

121. Claim 5 recites, in relevant part "wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation

of a preference selected by a participant to the charging process." Petitioner argues that Hotta teaches claim 5 because it "regards a charger 2 (purple) configured to ensure that the charging of an electric vehicle is completed by '[an] indicated scheduled boarding time.'" (Pet. at 57.) According to Petitioner, Hotta's boarding-time-selection functionality allows the user to indicate preferences with respect hereto. (*Id.* at 58.)

122. Petitioner fails to meet its burden as to claim 5 for two reasons. ***First***, claim 5 depends from claim 1, and thus incorporates all of its limitations, including that the interruption be detected during the flow of electricity. In Hotta, the scheduled time for boarding and using the vehicle are input before the charging begins, *i.e.*, ***not*** during the flow of electricity. As Hotta explains, the disclosed apparatus includes, among other things, a means for inputting the boarding time and

> charging start time calculating means for calculating a charging start time to finish the charging of the storage battery at the indicated scheduled boarding time based on the indicated scheduled boarding time and the calculated necessary charging period, the arrangement being such that the storage battery starts being charged with the predetermined charging current from the calculated charging start time.

(Ex. 1003 at 2:10-21.)

123. ***Second***, Hotta teaches meeting the preferences instead of failure to do so. Even if the battery cannot be fully charged to meet the boarding time, the controller starts charging the battery:

> If (Tc1+Tc2)>Tn . . . a message indicating that the storage battery 22 cannot be fully charged is displayed on the display unit 55 in a step S31. The controller 21 sets the charging start time Ts to the present time (TS=the present time) in a step S32. Thereafter, the controller 21 executes the charge holding mode "a" and then starts charging the storage battery 22.

(Ex. 1003 at 8:23-38.) In other words, failure to meet the boarding time does not result in the termination of the charging process. Thus, the combination of Kimura and Hotta would not render claim 5 unpatentable.

6. Claim 9

124. Claim 9 recites, in relevant part, "wherein the one or more interruptions is a manual override interruption, and wherein the computer program product further comprises: fourth program instructions for terminating the charging process in response to receiving, from a user, the manual override interruption." Petitioner does not make separate arguments for this claim (Pet. at 59), thus it fails to show

obviousness at least for the same reasons as with claim 2. (*Supra* Part VI.B.1.)

7. Claim 12

125. Petitioner does not provide separate arguments for claim 12. (Pet. at 59.) Because claim 12 recites, in relevant part "wherein the one or more interruptions is the ***preference interruption***, and the preference interruption is detected from a violation of a preference ***selected by a participant to the charging process***[,]" Kimura-Hotta does not render it obvious at least for the same reasons as with claim 5. (*Supra* Part VI.B.2.)

8. Claim 16

126. Claim 16 recites: "The apparatus of claim 15, wherein the one or more interruptions is a manual override interruption, and wherein the processing unit further executes the computer usable program code to terminate the charging process in response to receiving, from a user, the manual override interruption." Petitioner does not make separate arguments for this claim (Pet. at 59), thus it fails to show obviousness at least for the same reasons as with claim 2. (*Supra* Part VI.B.1.)

9. Ground 3: Kimura in View of King Does Not Render Obvious Claims 3, 10, and 17

127. For all claims in Ground 3 (claims 3, 10, and 17), Petitioner argues that Kimura-King teaches "storing the set of operational parameters in a storage

device" because King discloses storing parameters, such as battery temperature profile, ampere-hours of charge, battery charge profile, and charger status. (Pet. at 61-63.)

128. This argument fails because in King, those parameters have nothing to do with monitoring for and detecting interruptions. Rather, they are used to calculate the amount of recharge the battery requires:

> Operation of charger 24 is controlled by controller 36 in response to the measured parameters (current, voltage and battery temperature) and the stored data in memory34. Once controller 36 has calculated the net ampere-hour discharge using the above equations, the amount of recharge current can be determined from the following relationships.

(Ex. 1004 at 5:49-54.) Indeed, the purpose of King is to prevent overcharging of old batteries:

> The intelligent battery charger of the invention provides compensation to prevent overcharging of aged batteries. In addition, the computed state of charge, as shown by indicator 32 on the vehicle instrument panel, is compensated for the battery's reduced capacity as

> a result of battery age, operation at low battery temperatures, and excessive discharge rates.

(*Id.* at 5:42-48.) Thus, the proposed combination would not meet the limitations of claims 3, 10, and 17, and Petitioner's Ground 3 fails.

10. Ground 4: Keith Does Not Anticipate Claims 1, 2, 4-9, 11-16, and 18-20

11. Claim 1

129. As discussed in Ground 1, the recited "request" and "response" in elements 1[a] and 1[d] are messages and not merely signals, that are characteristic of rudimentary charging transactions that the '391 patent disparages. (*See* Part VI.A.1; Ex. 1001 at 6:65–7:2; Ex. 1001 at 7:12-16.)

130. Keith cannot anticipate claim 1 at least because Keith discloses use of signals (keys) instead of a "request," as Petitioner admits. (Pet. at 65-66.) For example, Keith explains

> The charge station computer (FIG. 13) then reaches a step 387 which ***sends a five second warning to the vehicle charge computer, key h,*** which causes the vehicle program (FIG. 14) to advance from test 386 to a pair of steps 388 where the display informs the operator that the

> communication phase is ending and the charge phase is going to begin, and then sends a confirming break, key j, in a step 389, and then goes into a one second wait at a step 390.

(Ex. 1005 at 20:15-23.)

131. Petitioner asserts that Keith discloses a "response" because the vehicle physically, mechanically, de-energizes the vehicle contact relay. (Pet. at 78.) As noted previously, in a data processing system, a message is a unit of data or information sent from one device to another that includes a header and a body. De-energizing a relay is not a message, either. Thus, Keith does not anticipate claim 1.

12. Claim 2

132. Claim 2 recites:

> The computer implemented method of claim 1, wherein the one or more interruptions is a manual override interruption, and wherein the computer implemented method further comprises:
>
> responsive to receiving, from a user, the manual override interruption, terminating the charging process.

(Ex. 1001 at 16:60-65.) As discussed above, the term "manual override interruption" should be construed as "an instruction that causes [ETEE] to terminate charging process, which a user may generate by interacting with a user interface." *Supra* Part V.B.

133. Petitioner argues that Keith anticipates claim 2 because it purportedly discloses that "a manual override interruption occurs when 'the operator moves a charge[/]run switch 77 into the open position.'" (Pet. at 80.) Moving a charge/run switch into the open position under Keith cannot anticipate claim 2 at least for four reasons.

134. ***First***, physically moving a charge/run switch as taught by Keith is not the same as generating an instruction as claimed. As an initial matter, Petitioner refers to an operator ***moving*** charge/run switch into the open position under Keith. (*Id.* at 80.) Moving a switch into the open/close position is a physical action different from generating an instruction. The passage on which Petitioner relies states in relevant part: "Assuming that the diagnostics are successful, the vehicle operator can indicate that a battery charge is to be acquired by closing a charge/run switch 77, which may be a discrete switch or may simply be a suitable keyboard input . . . ." (Ex. 1005 at 6:3-7.) Keith's charge/run switch in the open position is shown in Figure 1.

(Ex. 1005 fig.1.)

135. Discrete settings are settings that are either "on" or "off," "true" or "false." A discrete switch is a switch with only discrete and not continuous settings. Closing the discrete switch in Keith is akin to turning on a simple light switch—if a user wants to acquire charge, nothing more that manually moving the switch into the "on" position is required.

136. Further, Keith's mechanical "discrete switch," as shown in Keith's Figure 1, cannot be an instruction. A POSITA would understand "instruction," as that term is understood in the '391 patent to mean "an encoding of a series of operational steps specifying the details to be executed according to those operational steps." (Ex. 1001 at 15:13-16 ("[E]ach block in the flowchart or block diagrams may represent a module, segment, or portion of code, which comprises one or more executable instructions for implementing the specified logical function(s).").) A discrete manual switch is not the same as encoding instructions.

137. ***Second***, Keith's "suitable keyboard input through the cockpit keyboard and display system 75" is not an instruction, either. (*See* Ex. 1005 at 6:6-7.) Again, "an encoding of a series of operational steps specifying the details to be executed according to those operational steps." And a POSITA would understand that an instruction goes beyond the mechanical operation of pressing a button on a

keyboard. Because the keyboard/display in Keith may be used as a discrete switch, a POSITA would understand that any input from the keyboard would be interpreted as that of a discrete switch sending discrete signals—for example, hitting a keyboard once to signal for the charge to proceed:

> So, in summary, the focus in Keith (Ex. 1005 at 6:3-8) is on a signal that triggers a charge if diagnostics (interpreted by the user) indicate the need for acquiring one. A discrete switch is provided as an example, and a keyboard input that sends a discrete signal to proceed is provided as a second example. In both cases, the user's required manual involvement triggers a discrete signal to proceed with the charge at the user's discretion.

Therefore, because the keyboard input is an equivalent of turning the charge/run switch on/off, a POSITA would understand that an operator is inputting one of two available choices (on/off) and not generating instructions for the vehicle charge computer to interpret.

138. ***Third***, Keith does not disclose that transferring a charge/run switch into the open position ***causes ETEE*** to terminate charging process. Under Keith, when "the operator transfers the charge run switch 77 into the open position," this action—and not the ETEE—stops the charge. (Ex. 1005 at 8:30-31.)

139. To the extent Petitioner takes the position that moving the charge/run switch causes a computer to terminate the charging process, that computer cannot be the ETEE, either, because the charge/run switch in Keith is coupled with the vehicle charge computer 72, which serves as the ETIM. (Ex. 1005 fig.1.) The station charge computer 34 is not coupled with/connected to the charge/run switch. (Ex. 1005 fig.1.) Keith illustrates this point by disclosing that, when an operator moves the charge/run switch to the close position, this causes follow-up actions in the vehicle charge computer (ETIM) and not the station charge computer (ETEE):

> Ultimately, when the operator decides that a charge is in order, closure of the charge/run switch 77 (FIG. 1) will cause an affirmative result of step 178 which causes the vehicle charge computer 72 to advance to a payment/battery initialization routine.

(Ex. 1005 at 10:53-57.)

140. ***Fourth***, Keith does not go through the same process of identifying the manual override notification as an interruption and comparing it against predefined interrupt conditions (steps 72 and 704) as required in the ’391 patent:

(*Id.* fig.7.) As the ’391 patent’s specification explains,

> the process begins by making the determination as to whether an operational parameter of the charging process conforms to predefined interrupt conditions (step 702). The predefined interrupt conditions are predefined interrupt conditions, such as predefined interrupt conditions 412 in FIG. 4. If the process makes the determination that an operational parameter of the charging process conforms to predefined interrupt conditions, then the process identifies the operational parameter as an interruption (step 704).

(*Id.* at 14:22-30.) The same steps of monitoring and detecting are recited in claim 1 of the '391 patent from which claim 2 depends. These are absent from Keith. Thus, Keith's disclosure of a user moving a charge/run switch into the open position is not enough for anticipation. *Net MoneyIN*, 545 F.3d at 1371.

141. Petitioner's arguments to the contrary fail for three reasons. ***First***, Petitioner argues that "[i]n Keith, a manual override interruption occurs when 'the operator moves a charge[/]run switch 77 into the open position[.]" (Pet. at 80.) As explained above, physical movement of a charge/run switch into the open position under Keith is different from an generating an instruction that causes ETEE to terminate the charging process.

142. The first (of two) passage from Keith on which Petitioner relies support PO's position or are inapposite. The first passage—"The charge will continue until something goes awry, the credit established by the counting cash receiver 105 is exhausted, or the operator transfers the charge run switch 77 into the open position" (Ex. 1005 at 8:29-32)—shows that the operator's action terminates the charge instead of causing the ETEE to terminate the charging process. The second passage from Keith that Petitioner cites merely states how the vehicle is receiving charging power over physical connections. (*See* Pet. at 80 (citing Ex. 1005 at 8:1-6).)

143. ***Second***, Petitioner argues that Keith anticipates claim 2 because "Keith, just like the '391 Patent (Ex-1001, 12:26-31), also explains that its charge/run switch 77 can be part of a user interface. Ex-1005 at 6:6-8[.]" (Pet. at 81.) To begin, the cited portion of the '391 patent's disclosure explains that a user may generate a manual override interruption by interacting with a user interface (Ex. 1001 at 12:36-31) and is devoid of any mention of the charge/run switch. And the cited portion of Keith's disclosure explains:

> Assuming that the diagnostics are successful, the vehicle operator can indicate that a battery charge is to be acquired by closing a charge/run switch 77, which may be a discrete switch, or may simply

> be a suitable keyboard input through the cockpit keyboard and display system 75. It is response to the closing of the charge/run switch 77 (or equivalent) that causes ***the computer 72*** to provide signals on lines 78 and 79 ***to cause the infrared transmitter 39 and laser diode 51 to emanate radiation***, as described hereinbefore.

(Ex. 1005 at 6:3-13.) This disclosure does not support Petitioner's position at least because it (1) speaks of what happens after the closing of the charge/run switch and ***not*** after its opening; and (2) discloses that the closing of that switch causes the infrared transmitter and laser diode mounted on the vehicle to emanate radiation to communicate with the vehicle height detector, which has nothing to do with terminating the charging process (Ex. 1005 at 5:30-39).

144. ***Third***, opinions of Petitioner's expert Dr. MacCarley should be given no weight in connection with claim 2 because Dr. MacCarley defined "manual override interruption" as "a human being or ***some external, decision-making entity*** providing an input to the system that would lead to the interruption, the termination, of the charging process." (Ex. 2007 43:11-16.) This contradicts

17. the language of claim 2 reciting, in relevant part, "receiving, ***from a user***, the manual override interruption";

18. the patentees' definition, and

19. Petitioner's position that the manual override interruption is received from a "vehicle owner/operator" (Pet. at 82).

20. **Claim 4**

145. Claim 4 depends from independent claim 1. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 4 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 1 in Part VI.D.1 *supra*.

21. **Claim 5**

146. Claim 5 recites, in relevant part, "wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a ***violation*** of a preference selected by a participant to the charging process." Petitioner asserts only that Keith anticipates claim 5 because "[o]ne preference interruption in Keith involves exhaustion of the cash deposited by the user for charging. Ex-1005, 22:27-28. This is a preference selected by a participant to the charging process." (Pet. at 84.)

147. Petitioner's argument fails because even assuming that charging the battery until the cash deposit is exhausted is a preference, stopping the charging process when the cash deposit is exhausted ***meets*** that preference instead of violating it. Additionally, by Petitioner's logic, a violation of the preference to charge the

battery until the deposit is exhausted may mean that the charging process would stop prematurely, costing a pecuniary loss to the user "because the machine won't give a refund." (Ex. 1005 at 17:64). But the only remedy for stopping the charging process prematurely would be terminating the charging process. That simply cannot be the case.

22. **Claim 6**

148. As explained above, the term "data services interruption" in claim 6 should be construed to mean, among other things, an interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Part V.A; Ex. 1001 at 13:38-46 & 8: 38-44.) Keith does not anticipate claim 6 because it does not teach or suggest an interruption caused by the inability for information to be exchanged with a set of one or more third party data sources.

149. Petitioner only argues that Keith meets claim 6's limitations because it discloses that over-the-limit voltage may be detected,

> followed by a sequence of display steps 444-446 (green) at the vehicle leading to a request for data from a user (i.e., whether or not to override) and a response-waiting period of 10 seconds at step 447 (blue). Ex-1005, 23:16-39. If no response is received after 10 seconds (***an interruption in data services from the user failing to respond in time***),

> then the logic proceeds to 449 (red) and the charging process is terminated.

(Pet. at 85.)

(Pet. at 86 (excerpting a portion of Ex. 1005 fig. 16) (color added by Petitioner).) A user, however, is not a third-party data source, which under the '391 patent include, for example, weather information sources, traffic information sources, map and travel information sources, charging station price information Sources, or any other third party information sources. (*Id.* at 8: 38-44.)

150. Additionally, under element 1[d] of the '391 patent, this purported interruption should result in the energy transaction interrupt monitor sending a response to the energy transaction execution engine, and then the energy transaction execution engine should terminate the charging process. (*E.g.*, Ex. 1001 at 12:56-59.) In contrast, in Keith, after displaying the override question and receiving no response, the vehicle charge computer—corresponding to the energy transaction interrupt monitor and not energy transaction execution engine, as required by element 1[d]—deenergizes the vehicle main contact relay 94. (Ex. 1005 at 23:30-31; *id.* fig. 16 (displaying vehicle-side steps).) Thus, the wrong element terminates the charging process in this purported data services interruption

under Keith.

151. Lastly, Keith calls the user/operator response in the situation above "the override." (Ex. 1005 at 23:41; *id.* fig. 16 (step 446 "Display: Override").) PO does not concede that Keith discloses manual override interruptions claimed in the '391 patent (it does not, as explained in relation to claim 2, *see supra* Part VI.D.2), but notes that the '391 patent recites manual override interruptions in claim 2, 9, and 16. Petitioner's equating manual override interruptions with the data services interruptions would largely render claims 2, 9, and 16 of the '391 patent superfluous, which is contrary to the doctrine of claim differentiation. *See Versa Corp. v. Ag-Bag Int'l Ltd.*, 392 F.3d 1325, 1330 (Fed. Cir. 2004) ("The doctrine of claim differentiation 'creates a presumption that each claim in a patent has a different scope.' The difference in meaning and scope between claims is presumed to be significant 'to the extent that the absence of such difference in meaning and scope would make a claim superfluous.'") (internal quotation marks and citations omitted).

23. **Claim 7**

152. Claim 7 recites, in relevant part, "wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions." Petitioner failed to meet its burden as to claim 7 because it failed to show "detecting by

identifying an operational parameter from the set of operational parameters" in Keith.

153. As explained in Ground 1 (*supra* Part VI.A.5), a POSITA would understand claim 7 to mean that an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions ***is identified before each new charging transaction, during the pre-charge phase***. (Ex. 1001 at 7:12-25.) The conditions governing each transaction include predefined interrupt conditions, which include rules involving operational parameters. The operational parameters in the predefined interrupt conditions are the set of operational parameters from which the claimed invention identifies operational parameters to monitor.

154. Petitioner argues only that Keith anticipates claim 7 because it discloses "determin[ing] if the current provided by the line current measuring circuit 129 … exceeds a current limit which is established by manufacturer's data." (Pet. at 87.) However, Petitioner does not explain whether the current limit is an operational parameter identified from a set of operational parameters that conform to a set of predefined interrupt conditions. Furthermore, a current limit preestablished by manufacturer's data cannot be changed in the pre-charge phase of a charging transaction, as required in the '391 patent. (Ex. 1001 at 7:41-49.)

24. **Claim 8**

155. Claim 8 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.)

25. **Claim 9**

156. Claim 9 recites, in relevant part "wherein the one or more interruptions is a manual override interruption, and wherein the computer program product further comprises: fourth program instructions for terminating the charging process in response to receiving, from a user, the manual override interruption." Petitioner does not advance any substantive arguments regarding claim 9, therefore it failed to show that Keith anticipates this claim for at least the same reasons as with claim 2. (*See supra* Part VI.D.2.)

26. **Claim 11**

157. Claim 11 depends from independent claim 8. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 11 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 8 in Part VI.D.7 *supra*.

27. **Claim 12**

158. Petitioner does not provide separate arguments for claim 12. (Pet. at 90.) Because claim 12 recites, in relevant part "wherein the one or more interruptions is the ***preference interruption***, and the preference interruption is detected from a

violation of a preference ***selected by a participant to the charging process***[,]" Keith does not anticipate it for the same reasons as with claim 5. (*Supra* Part VI.D.5.)

28. **Claim 13**

159. With claim 13, Petitioner merely argues that "Claims 9 and 11-14 are otherwise analogous to Claims 2 and 4-7, respectively, so these claims are anticipated for reasons analogous to those. . . ." (Pet. at 90.) Accordingly, Petitioner failed to show obviousness of claim 13 at least for the same reason as with claim 6—namely, that Kimura does not teach or suggest a data services interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Parts V.A & VI.D.5.)

29. **Claim 14**

160. Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 90), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.D.6.)

30. **Claim 15**

161. Claim 15 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.)

31. **Claim 16**

162. Petitioner does not advance any substantive arguments regarding claim 16,

therefore it failed to show that Keith anticipates this claim for at least the same reasons as with claim 2. (*See supra* Part VI.D.2.)

32. Claim 18

163. Claim 18 depends from independent claim 15. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 18 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 15 in Part VI.D.13 *supra*.

33. Claim 19

164. Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 93), thus its challenge fails at least for the same reasons as with claim 7. (*Supra* Part VI.D.6.)

34. Claim 20

165. Claim 20 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.)

13. Ground 5: Keith Does Not Render Obvious Claims 3, and 8-19

14. Motivation to Combine Keith with POSITA's Knowledge

166. Petitioner does not even attempt to show that a POSITA would be motivated to combine the teachings of Keith with its knowledge in the art or that a POSITA would have a reasonable expectation of success. (*See* Pet. at 95.) Notably, Dr. MacCarley conceded at his deposition that he did not provide a separate

obviousness analysis (which should have included a POSITA's motivation to combine and likelihood of success) because he did not think he was required to do so:

> Q. Okay. So, Dr. MacCarley, are—are there any elements of Independent Claim 1 that are not disclosed in Keith but would have been obvious in your opinion?
>
> A. Well, let me answer that two ways. It's my contention that Claim 1 is anticipated by Keith, which I think technically means that nothing needed to be obvious if it was already anticipated. That's a stronger criteria.
>
> . . .
>
> A. . . . So as you asked the question, did I feel anything—did I feel the need to use obviousness to connect the dots on any of these? No.

(Ex. 2007 at 71:23–72:19.)

This alone is enough to dismiss Petitioner's Ground 5.

15. Claim 3

167. Petitioner argues that Keith discloses storing cost and kilowatt hours and that it would have been obvious to store the purported operational parameters in a storage device. (Pet. at 95-97.) Petitioner's argument that Keith renders claim 3

obvious fail for three reasons.

168. ***First***, kilowatt hours and cost are not operational parameters, and Petitioner admits as much—"Keith does not appear to disclose using these two parameters at the vehicle charge computer 72 for interruption detection . . . . ." (Pet. at 96.)

169. ***Second***, storing kilowatt hours and cost in Keith have nothing to do with monitoring for and detecting interruptions. Rather, they are calculated and stored to prevent overpayment by the customer:

> The calculation of kilowatt hours employs straightforward sampling of volts and amps on a cyclic basis, and utilizing a constant related to cycle time to multiply into volt-amp-hours. The cost is simple multiplication of rate; either absolute or selected by real time from a table. Then, a test 435 ***determines if the amount of cash which has been deposited is exhausted***.

(Ex. 1005 at 22:22-28; *see also id.* at 17:61-64 ("calculate a maximum fee that the operator should insert in order to avoid overpaying. This is to prevent paying for more power than the vehicle can use: the machine won't give a refund.").)

170. ***Third***, Petitioner argues that Keith discusses displaying current and voltage, and that a POSITA would understand that a display requires storage of those

parameters. (Pet. at 96-97.) This argument is contradicted by Keith's disclosures because it expressly and consistently indicates when a measurement is stored or merely displayed. Regarding kilowatt hours and cost, calculating, storing, and displaying is disclosed. (*See, e.g.*, *id.* at 23:60-61 ("calculates and stores the kilowatt hours and cost so far"); *id.* at 22:25-29 ("The cost is simple multiplication of rate; either absolute or selected by real time from a table. Then, a test 435 determines if the amount of cash which has been deposited is exhausted.").) Petitioner cannot point out to a similar disclosure with current or voltage. (*See id.* at 21:58-63 ("If there is so low a current as to indicate a bad connection, an affirmative result of test 421 will reach a step 424 in which the external display 85 provides an indication to the operator that there is a bad connection between the vehicle and the station and that the operator should try the process all over again."); *id.* at 22:5-8 (If there is excessive current, an affirmative result of the test 426 will reach a step 428 which causes the external display 85 (FIG. 1) to provide an indication to the operator that there is excess current[.]").)

16. Claim 8

171. Claim 8 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1. (*Supra* Part VI.D.1.)

17. Claim 9

172. Petitioner did not advance any substantive arguments that claim Keith renders claim 9 obvious and relied instead on its anticipation assertions. (Pet. at 98.) Thus, it failed as to claim 9 for the same reasons as in Ground 4. (*See supra* Part VI.D.8.)

18. Claim 10

173. Petitioner did not advance any substantive arguments that claim Keith renders claim 10 obvious and relied instead on its anticipation assertions. (Pet. at 98.) Thus, it failed as to claim 10 for the same reasons as with claim 3. (*See supra* Part VI.E.2.)

19. Claim 11

174. Claim 11 depends from independent claim 8. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 11 is not rendered obvious by Keith for at least all of the reasons discussed above with regard to claim 8 in Part VI.E.3 *supra*.

20. Claim 12

175. Petitioner did not advance any substantive arguments that claim Keith renders claim 12 obvious and relied instead on its anticipation assertions. (Pet. at 98.) Thus, it failed as to claim 9 for the same reasons as in Ground 4.

21. Claim 13

176. In addition to failure to show that a POSITA would have a motivation to combine Keith and with his background knowledge and a reasonable likelihood of

success, Petitioner failed to make any separate arguments regarding obviousness of claim 13 in view of Keith. (*See* Pet. 98; *see also* Paper 13 at 3.) Instead, Petitioner argued that Keith renders this claim obvious because it allegedly anticipates it. (*Id.* at 98.) Accordingly, Petitioner's argument additionally fails for the same reason as Keith's anticipation arguments for claims 6 and 13. (*See supra* Parts VI.D.5 & D.10.)

22. Claim 14

177. Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 98), thus its challenge fails at least for the same reasons as with claim 7 in Ground 4. (*Supra* Part VI.D.6.)

23. Claim 15

178. Claim 15 recites, in relevant part, elements substantially similar to those in elements 1[a] and 1[d]. Therefore, Petitioner's challenge fails for the same reasons as with claim 1 in Ground 4. (*Supra* Part VI.D.1.)

24. Claim 16

179. Petitioner did not advance any substantive arguments that claim Keith renders claim 16 obvious and relied instead on its anticipation assertions. (Pet. at 99.) Thus, it failed as to claim 9 for the same reasons as in Ground 4. (*See supra* Part VI.D.8.)

25. Claims 17

180. Petitioner did not advance any substantive arguments that claim Keith

renders claim 17 obvious and relied instead on its anticipation assertions. (Pet. at 99.) Thus, it failed as to claim 3 for the same reasons as with claim 3 and Ground 4. (*See supra* Part VI.E.2.)

26. Claim 18

181. Claim 18 depends from independent claim 15. A dependent claim contains all of the limitations of the claim or claims from which it depends. Therefore, claim 18 is not anticipated by Keith for at least all of the reasons discussed above with regard to claim 15 in Part VI.E.10 *supra*.

27. Claim 19

182. Petitioner does not advance any separate substantive arguments for claim 14 (Pet. at 99), thus its challenge fails at least for the same reasons as with claim 7 in Ground 4. (*Supra* Part VI.D.6.)

F. Ground 6: Keith in View of Nor Does Not Render Claims 6 or 13 Obvious

1. Claim 6

183. As explained above, the term "data services interruption" should be construed to mean, among other things, an interruption caused by the inability for information to be exchanged with a set of one or more ***third*** party data sources. (*Supra* Part V.A; Ex. 1001 at 13:38-46; *id.* at 8: 38-44.) A Keith-Nor combination cannot render claim 6 obvious because nowhere does it teach or suggest a data services interruption caused by the inability of information exchange with ***third***

party data sources.

184. For claim 6, Petitioner relies only on Nor and asserts a single argument that Nor renders obvious the additional limitations of claim 6 because it discloses "a data services interruption occurs when the battery charge controller 86 (pink) of the electric vehicle 80 (turquoise) fails to communicate with the charging station 82 (purple). Ex-1006, 4:52-63." (Pet. at 101.)

(Pet. at 101 (citing Ex. 1006 fig. 2 (color added by Petitioner).)

185. However, Nor does not teach or suggest communications/ failure to communicate with third parties service . Rather, it concerns communications between the vehicle side and the charging station and speaks only of "***communication means*** that are capable of transferring ***data concerning the state of charge*** of the battery being charged ***between the battery and the charging station***[,]" *i.e.*, without involvement of third parties. (*See* Ex. 1006 at 2:53-55.) The exceprt from Nor cited by Petitioner discloses "a monitoring system which monitors the data communication link ***between the electric batter***y being charged ***and the power station***, and the charge controllers may be established in such a manner that they continuously monitor and exchange signals periodically . . . ." (*Id.* at 4:52-63.)

As discussed in Ground I, Dr. MacCarley's opinions regarding data services interruptions should be given no weight because he was not aware that the patentees furnished their own definition if this term in the '391 patent's specification. (Ex. 2007 at 34:22-25); *supra* Part VI.A.)

35. **Claim 13**

186. Petitioner makes an attorney argument that Keith-Nor renders claim 13 because it is similar to claim 6 and because Keith anticipates claim 8. (Pet. at 103.) To the extent PO is required to address this unsubstantiated assertion, it fails for the same reason as Petitioner's claim 6 argument *supra* Part VI.F.1.

X. CONCLUSIONS

187. I reserve the right to revise, supplement, and/or amend my opinions in this declaration based on future positions taken by Petitioner and/or their experts, additional documents, testimony, or other information provided by Petitioner or its witnesses, any orders from the Court, or as I may otherwise find necessary and to offer rebuttal analyses and/or opinions to any such positions of the Petitioner.

188. I expect to continue to develop my opinions discussed in this report. I also reserve the right to supplement my opinions based on information obtained from additional discovery or from Petitioner's experts, as indicated above.

189. When called upon to do so, I will offer testimony at trial or otherwise

regarding these opinions and will offer rebuttal testimony as appropriate throughout the remainder of this proceeding.

190. I currently hold the opinions expressed in this declaration, but my analysis may continue, and I may acquire additional information and/or attain supplemental insights that may result in added observations.

191. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and 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 and that any such willful false statements may jeopardize the validity of the patent at issue in this proceeding.

Dated: November 8, 2024



Dr. Kirk W. Cameron

Kirk W. Cameron, Ph.D.

http://www.cs.vt.edu/~cameron +1.540.557.7452 (M) kirk.w.cameron@gmail.com

ACADEMIC EXPERIENCE	**VIRGINIA POLYTECHNIC INSTITUTE & STATE UNIVERSITY**	*August 2005-Present*
	Associate Vice President for Academic Affairs, Innovation Campus	*August 2023-Present*
	Faculty Lead, Innovation Campus	*August 2022-Present*
	Founder and Executive Director, cs/root	*August 2022-Present*
	Founder and Executive Director, BURGS	*August 2018-Present*
	Assoc. Dept. Head for Research and Engagement (5 direct reports)	*August 2018-2022*
	QUEENS UNIVERSITY BELFAST World Leading Researcher Fellow	*August 2017-May 2018*
	BRITISH ROYAL ACADEMY Distinguished Visitor Fellowship	*August 2017-May 2018*
	Assoc. Dept. Head for Graduate Studies	*August 2014-2017*
	Director, stack@cs Center for Computer Systems	*June 2013-2023*
	Professor of Computer Science	*June 2012-Present*
	Faculty Fellow, College of Engineering	*May 2007-Present*
	Associate Professor of Computer Science	*Aug 2005-May 2012*
	Founder and Director, Scalable Performance Laboratory (SCAPE)	*August 2001-Present*
	UNIVERSITY OF SOUTH CAROLINA Asst. Prof. of CSE	*August 2001-August 2005*
	FLORIDA INSTITUTE OF TECHNOLOGY Asst. Prof. of CS	*August 2000-July 2001*
CORPORATE EXPERIENCE	**MISERWARE, INC.**	*August 2007-2014*
	Founder, CEO, and CTO	
	Venture-backed VT Spinout Company; Raised over $3M in venture capital funding.	
	INTEL CORPORATION	*May 1996-January 1997*
	Engineer: 82450 NX Multiprocessor Chipset Design Team	
LABORATORY EXPERIENCE	**LOS ALAMOS NATIONAL LABORATORY CIC DIVISION**	*January 1998-August 2000*
	Research Assistant: Parallel Architecture Laboratory, ASCI (Accelerated Strategic Computing Initiative)	
SELECT ACADEMIC HONORS	**IEEE FELLOW** For contributions to measurement and management of energy in high-performance computing systems	*January 2021*
	DEAN'S AWARD FOR EXCELLENCE IN SERVICE	*April 2024*
	DEAN'S AWARD FOR EXCELLENCE IN RESEARCH	*September 2020*
	INFOCOMP 2018 Best Paper Award	*September 2018*
	ACM Distinguished Scientist for "Contributions to Computing"	*November 2017*
	LLNL Deputy Director's Science/Tech Excellence Award	*September 2017*
	U.K. ROYAL ACADEMY OF ENGR. Distinguished Visiting Fellowship	*August 2017-May 2018*
	ACM HPDC 2017 – Karsten Schwan Memorial Best Paper Award	*July 2017*
	MAGPI MAGAZINE -- #2 RPI PROJECT OF ALL TIME LIST (SeeMore)	*September 2016*
	OUTSTANDING SERVICE – IPDPS 2016 (also CCGRID 2014)	*May 2016*
	INT'L MAKERS FAIRE 2015 – 3 Editor's Choice Awards (SeeMore)	*September 2015*
	AMD FACULTY AWARD	*May 2014*
	NAE FRONTIERS SYMPOSIUM Organizer, (also Invitee 2008, 2010)	*May 2014*
	VT SCHOLAR OF THE WEEK	*October 2010*
	MICROSOFT FACULTY SUMMIT (also 2007)	*June 2009*
	IBM FACULTY AWARD	*July 2007*
	VT COE FACULTY FELLOW	*May 2007*
	IEEE/ACM SUPERCOMPUTING Best Paper Finalist	*November 2006*
	USC COEIT Young Investigator Research Award	*May 2005*
	DEPARTMENT OF ENERGY CAREER AWARD	*August 2004*
	NATIONAL SCIENCE FOUNDATION CAREER AWARD	*January 2004*
SELECT CORPORATE	**ROANOKE-BLACKSBURG TECH COUNCIL** Rising Star Award	*May 2013*
	***BLOOMBERG BUSINESSWEEK* MAGAZINE** Innovator of the Week	*October 2011*

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HONORS	**PC MAGAZINE – TOP 20 FREE UTILITY APP** (GRANO.LA)	*February 2011*
	TIME MAGAZINE – TOP 20 GREEN TECH IDEA (GRANO.LA)	*December 2010*
	MINDSHARE NETWORK – CEO Networking and Mentoring Program	*December 2009*
GREEN IT EXPERIENCE	**GRANO.LA SOFTWARE** Over 500K users in 160+ countries.	*April 2010 – March 2014*
	SPEC POWER BENCHMARK Founding subcommittee member.	*June 2005 – Present*
	ENERGY STAR FOR SERVERS (DOE) Consulting member.	*August 2005 – Present*
	IEEE COMPUTER Green IT columnist, associate editor.	*January 2009 – January 2017*
	THE GREEN500 LIST (GREEN500.ORG) Founder	*January 2006 – Present*
	THE UPTIME INSTITUTE Fellow	*August 2008 – Present*
EDUCATION	**LOUISIANA STATE UNIVERSITY**, Baton Rouge, LA **Doctor of Philosophy** in Computer Science	*August 2000*
	UNIVERSITY OF FLORIDA, Gainesville, FL **Bachelor of Science** in Mathematics	*April 1994*

NOTABLE ADMINISTRATIVE ACCOMPLISHMENTS

Associate Vice President for Academic Affairs, Innovation Campus, Virginia Tech (2023-Present). Oversee all academics at the Innovations campus including faculty affairs, student affairs, professional degree program design and implementation, outreach, establishing community, etc. Lead role in management, hiring, and development of experiential learning pedagogy for (at scale) 700 M.Eng. graduates per year across 2 degree programs.

Founding Faculty Lead, Innovation Campus, Virginia Tech (2022-Present). Lead faculty, or department head equivalent, with 12 Tenured faculty and 5 Collegiate Faculty spanning Computer Science and Computer Engineering (as of 8/23). Grow faculty to 50 total at full buildout (5-7 years).

Creation of CS/root Entrepreneurial Hub, Virginia Tech (2022-Present). PI and co-founder of cs/root, an entrepreneurial hub that brings together VT CS alumni and friends that are technical founders to mentor Region 2 would-be entrepreneurs coming from a technical background. This hub was inspired by my struggles as a technical-founder entrepreneur.

Creation of Associate Department Head for Research and Engagement (2018-2022): Recruited by DH (Cal Ribbens) to create position to manage CS Research, Marketing, Communications, Alumni relations, Corporate relations, Economic development

- Recruited and hired 4 AP/faculty personnel and 1 staff to handle aspects of research and engagement mission
- Responsible for working with companies to identify research opportunities
- Rebranded CS|Source corporate membership program and doubled revenue twice
- Via CS|Source provided $100k/year in undergraduate merit-based scholarships since 2019 to CS students
- PI for $500k Go-Virginia Economic Development Grant for department-led blockchain entrepreneurial activities
- Contributed to **CS Grad Ranking US News (from #40 to #38).** Now tied with: NYU, Rutgers, Texas A&M, UC Boulder.

Research Leadership (2013-2022)**:** Recruited by DH (Barbara Ryder) to direct Center for High-End Computing Systems (CHECS)

- Rebranded and broadened to stack@cs Center for Computer Systems (~1 dozen faculty in systems and security)
- Doubled external grant funding ($1M→$2M annually) over 5 years (2013-2018); on track to double again by 2023
- Designed protocols for hiring and mentoring systems faculty for 4 years – 5 NSF and 1 DoD Early Career awards
- Led center to first-ever ranking in **US News Computer Systems Programs (#26 in 2022).** Tied with USC, UChicago, Rice.

Graduate Program Leadership (2014-2017): Recruited by DH (Barbara Ryder) to direct the CS MS/PhD graduate program

- Responsible for matriculation of ~250 graduate students per year (~60% PhD, ~40% MS)
- Created Draft Day event for unification and quality control of graduate recruitment; adopted permanently by department
- Increased substantially the departments campus-wide competitiveness for graduate scholarships and fellowships
- Led development and broad adoption of automated software for annual student performance and faculty evaluations

Broadening Participation Leadership (2014-Present):

- Led innovative broadening participation plan to increase student participation from underrepresented groups
- Fostered pipeline from CS systems intro courses into the BS/MS, MS and PhD programs

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- Increased research participation (2x) above department norms for women (50%) and African Americans (20%).
- Scaling effort to create Broadening Undergraduate Research Group for Systems (BURGS).
- Demonstrated SeeMore kinetic sculpture to 100k+ science and technology faire attendees (tens of thousands K-12)
- Demonstrated LACE kinetic sculpture to 30k+ visitors at Smithsonian National Museum of American History.

Entrepreneurial Leadership (2006-2014):

- Founder, CEO, CTO of energy measurement and management startup based on externally funded research
- Raised >$3M in venture capital and grew company to 10 employees
- Mindshare DC-area executive startup management course (by invitation only) and membership Class of 2009
- Released commercial software and grew user base to 500k users in 160+ countries

Other Relevant Leadership:

- Elected (by CS faculty) and appointed chair (by dean) of 5-year department head performance review (2020-2021)
- Elected (by CS faculty) to Tenure and Promotion (Personnel) committee for multiple 3-year terms (Chair: 2015-2016)
- Appointed (by CS DH) to Faculty Innovation Campus Advisory Board (Chair: Lance Collins, Director Innovation Campus)
- Initiated many aspects of CS mentoring program for new faculty (mock CAREER panels, mentor structure, etc.)

SELECT FUNDING (Total External Funding as PI: ~$13M, Total External Funding: ~$16M)

[LLNL] Lawrence Livermore National Laboratory, "Automating AI/ML-based Tuning for High-performance Computing," **$98,978**, 12/6/22 – 5/31/24. Kirk W. Cameron (PI). [Department of Energy, Office of Science.]

[COSTAR] CoStar Group, "Systems Capstone: Emergent Computing for apartments.com," **$25,000**, 1/1/23 – 5/14/23. Kirk W. Cameron (PI).

[GOVA] Growth and Opportunity Virginia Grant, "cs/root entrepreneurial hub," **$250,000**, 10/15/2022-10/14/2023. Kirk W. Cameron (**VT Lead**). I am the lead on this economic development project related to entrepreneur training and education.

[NSF] National Science Foundation, "CSR: Large: VarSys: Managing variability in high-performance computing systems," **$1,200,000**, 8/15/19 – 8/14/23. Kirk W. Cameron (**PI**), Danfeng Yao (co-PI), Layne T. Watson (co-PI), Ali Butt (co-PI), Yili Hong (co-PI), Godmar Back (SP). [NSF CNS #1838271]

[NSF] National Science Foundation, "CNS: CORE: Small: iLORE: Computer Systems Performance Integrated Lineage Repository," **$500,000**, 10/01/2019 - 9/30/2023. Kirk W. Cameron (**PI**), Margaret Ellis (co-PI), Godmar Back (co-PI). [NSF CNS #1939076]

[NSF] National Science Foundation, "SPX: Collaborative Research: Cross-stack Memory Optimizations for Boosting I/O Performance of Deep Learning HPC Applications," **$1,200,000**, 10/01/2019 - 9/30/2022. Ali Butt (VT PI), Xun Jian (VT co-PI), Kirk W. Cameron (**VT co-PI**), Yue Cheng (GMU PI). [NSF CCF #1919113]

[VT] VT ICAT and VT ICTAS, SEAD Program, "Ada: Understanding Decentralized, Distributed Computing and Blockchains through Kinetic Sculpture," **$75,000**, 9/1/20 – 8/31/22. Sam Blanchard, Kirk W. Cameron.

[B1] Block.One, "VT Blockchain Virtual Laboratory," **$50,000**, 11/1/2018-6/1/2020. Kirk W. Cameron (**PI**). This is a grant to support research, development, and training on blockchain technologies in Capstone courses.

[GOVA] Growth and Opportunity Virginia Grant, "Blockchain Ecosystem Catalyst," **$500,000**, 10/15/2019-10/14/2021. Kirk W. Cameron (**VT Lead**). I am the lead on this economic development project related to blockchain training and education.

[RAE] Royal Academy of Engineering Distinguished Visiting Fellowship, "Co-design of hardware and software for variability in high-performance computing systems," **£3,300 ($4,573)**, 2017-2018. Kirk W. Cameron (**PI**), Dimitrios Nikolopoulos (QUB Host). Personal Share: $4,573. [UK-wide, highly competitive]

[QUB] "World Leading Researcher" Faculty Fellowship, The Queen's University – Belfast, "Co-design of hardware and software for variability in high-performance computing systems," **£108,269 ($150,000)** , 2017-2018. Kirk W. Cameron (**PI**). Personal Share: $150,000. [world-wide, highly competitive]

[NSF] National Science Foundation, "CSR: Large: VarSys: Managing variability in high-performance computing systems," **$1,200,000**, 8/15/16 – 8/14/19. Kirk W. Cameron (**PI**), Danfeng Yao (co-PI), Layne T. Watson (co-PI), Ali Butt (co-PI), Yili Hong (co-PI), Godmar Back (SP). [NSF CNS #1565314]

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[MITRE] Mitre Corporation, "Enhancement of Senior Capstone Projects with Mitre," **$25,000,** 8/22/16 – 12/15/16. Kirk W. Cameron (**PI**). Personal Share: $25,000.

[NSF] National Science Foundation, "Exploiting slowdowns for speedup in power-scalable HPC systems," **$500,000**, 8/1/14 – 7/31/17. Kirk W. Cameron (**PI**), Ali Butt (co-PI). Personal Share: $250,000. [NSF #1422788]

[NSF] National Science Foundation, "Collaborative: Application-aware Energy Modeling and Power Management for Parallel and High Performance Computing," **$500,000**, 8/1/14 – 7/31/17. **PI**s: Kirk W. Cameron (VT), Yonghong Yan (UHouston). Personal Share: $250,000. [NSF #1422712]

[AMD] Advanced Micro Devices, "Power and energy measurement of mobile devices," **$75,000**, 5/1/14 – 4/30/15. Kirk W Cameron (**PI**). Personal Share: $75,000.

[NSF] National Science Foundation, "Kinetic Computing Sculpture: A functional parallel cluster of Raspberry Pi computers that inspire computational thinking," **$181,395**, 9/23/13 – 9/23/14. Kirk W. Cameron (**PI**), Aditya Johri (co-PI), Sam Blanchard (Senior Personnel). Personal Share: $131,395. [NSF # 1355955]

[VT] VT Institute for Creativity, Arts, and Technology, SEAD Program, "A kinetic sculpture and functional parallel cluster of Raspberry Pi computers," **$25,000**, 7/1/13 – 7/1/14. Sam Blanchard, Kirk W. Cameron, Ali Butt.

[NSF] National Science Foundation, "SBIR Phase II: Intelligent Software Power Management for Windows-based Systems," **$350,000**, 9/15/10 – 9/14/12. Awarded to MiserWare, Inc. (Kirk W. Cameron, CEO)

[NSF] National Science Foundation, "CSR: Large: Collaborative Research: Multi-core Applications Modeling Infrastructure (MuMI)," **$2,400,000**, 9/1/09 – 8/31/14. **PI**s: Kirk W. Cameron (VT), Shirley Moore (Utenn), Valerie Taylor (TAMU). Personal share: $800,000.

[NSF] National Science Foundation, "CSR: Medium: Collaborative Research: GridPac: A Resource Management System for Energy and Performance Optimization on Computational Grids," **$1,100,000**, 9/1/09 – 8/31/13. PIs: Kirk W. Cameron, Jack Dongarra (Utenn), Ishfaq Ahmad (UTSA), Sanjay Ranka (UF). Personal share: $180,000.

[NSF] National Science Foundation, "SBIR Phase I: Intelligent Software Power Management on Multicore Systems," **$100,000**, 5/1/10 – 9/15/10. Awarded to MiserWare, Inc. (Kirk W. Cameron, CEO)

[NSF] National Science Foundation, "Metrics And Methodologies for High Performance System Energy Benchmarking," **$200,000**, 7/31/08 -7/30/09. Kirk W. Cameron (PI), Wu-Chun Feng (co-PI). Personal share: $100,000

[NSF] National Science Foundation, "CSR-AES: Thermal Conductors: Runtime Software Support for Proactive Heat Management in Advanced Execution Systems," **$350,000**, 7/30/07-7/29/10. Kirk W. Cameron (PI), Dimitris Nikolopoulos (co-PI). Personal share: $175,000.

[NSF] National Science Foundation, "CRI: MISER: A High-Performance Power-Aware Cluster," **$500,000**, 9/18/07-9/17/10. Kirk W. Cameron (PI), Dimitris Nikolopoulos (co-PI), Adrian Sandu (co-PI). Personal share: $200,000.

[NSF] National Science Foundation, "High-Performance Power-Aware Computing Workshop," **$5,000**, 9/21/07-1/3/09. Kirk W. Cameron (PI). Personal share: $5,000.

[IBM] IBM Faculty Award, "Building the Tree of Life using IBM BlueGene/L and Cell Broadband Engine Technologies", **$38,000**, 7/1/07 – 6/30/08. Kirk W. Cameron (PI). Personal share: $38,000

[ML] Merrill Lynch & Co. Inc, "Integrating PowerPack technologies in the Virtual Server Switch," **$55,000**, 7/1/07 – 6/30/08. Kirk W. Cameron (PI). Personal share: $55,000.

[CS] Crucial Security, "Study of Parallel I/O," **$25,000**, 1 semester. 9/1/06-12/15/06. Kirk W. Cameron (PI). Personal share: $25,000.

[NSF] National Science Foundation, "CCF: REU Supplement for high-performance, power-aware, distributed computing," **$12,000**, 1 year. 5/15/06-5/14/07. Kirk W. Cameron (PI). Personal share: $12,000.

[NSF] National Science Foundation, "Collaborative Research: CSR(SMA): Scalable performance modeling and analysis framework," **$50,000**, 1 year. 9/1/05-8/31/06. Kirk W. Cameron (PI, VT), Xian-He Sun (PI, IIT). Personal share: $25,000.

[DOE] Department of Energy, Office of Science, Early Career Principal Investigator Program. "Ultra-scale memory analysis for high-end computing", **$300,004**, 3 years. 9/1/04-8/31/07. Kirk W. Cameron (PI). Personal share: $300,004

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[NSF] National Science Foundation, "CCF: REU Supplement for high-performance, power-aware, distributed computing," **$17,500**, 1 year. 5/15/04-5/14/05. Kirk W. Cameron (PI). Personal share: $17,500.

[NSF] National Science Foundation, "CAREER: High-performance, power-aware distributed computing," **$402,203**, 5 years. 2/1/04-1/31/09. Kirk W. Cameron (PI). Personal share: $402,203.

[USC] USC Office of Research Equipment Grant, "The SC Grid Initiative." **$45,000**, 1 year. 04/04/03 – 06/30/04. Kirk W. Cameron (PI), John Rose (co-PI). Personal share: $22,500.

[INTEL] Intel Corporation, "Telecommunication softswitch hardware." **$4,000**, Equipment. Permanent beginning 2/1/03. Kirk W. Cameron (PI). Personal share: $4,000.

[IXIA] Ixia Corporation, "Utilization of Aggregate Network Load Modules for High-Performance Computing Applications." **$301,204** ($250,000 in hardware, $51,204 direct+indirect). 9 months. 1/1/03-08/31/03. Kirk W. Cameron (PI), Duncan Buell (co-PI). Personal share: $225,000 in hardware, $48,083 research expenditures.

[IXIA] Ixia University Partnership Program (IxUPP), "Ixia Network Performance Monitoring System." **$106,950**, Equipment. Ixia 1600 Chassis ($26950) and IxExplorer ($80000). Permanent donation 10/1/02. Kirk W. Cameron (PI), Srihari Nelakuditi (co-PI). Personal share: $96,255

[USC] USC Office of Research VPR Opportunity Fund. "Benchmarking Telecommunication Workloads for the Next Generation Network", **$71,194**, ($35,597 + 1:1 match), 1 year. 7/1/02-6/30/03. Kirk W. Cameron (PI). Personal share: $71,194.

[DOE] Department of Energy, Laboratory Directed R&D (DOE-LDRD) Computer Science and Software "Dynamic Adaptive Superscalar Microprocessor Architecture" **$110,000** per year, 3 years. 9/1/99-8/31/02 Yong Luo (PI), Maya Gokhale (PI), Kirk W. Cameron (Senior Personnel). Personal share: none.

SELECT VENTURE-BACKED CAPITAL FUND RAISING (Total Funding as CEO: ~$3M

[VC] Valhalla Partners, Virginia Center for Innovative Technologies, Dark Angels. "Product Development", $622,500, December 2007, Kirk W. Cameron (CEO). [Series A]

[VC] Valhalla Partners, Virginia Center for Innovative Technologies, Dark Angels. "Non-recurrent Engineering", $175,000, November 2009, Kirk W. Cameron (CEO). [Series A Bridge]

[VC] Valhalla Partners. "Non-recurrent Engineering", $100,000, March 2010, Kirk W. Cameron (CEO). [Series A Bridge]

[VC] InQTel. "Non-recurrent Engineering", $500,000, March 2010, Kirk W. Cameron (CEO). [Series A Bridge]

[VC] Valhalla Partners. "Non-recurrent Engineering", $400,000, July 2011, Kirk W. Cameron (CEO). [Series A Bridge]

[VC] Virginia Center for Innovative Technologies. "Non-recurrent Engineering", $200,000, February 2012, Kirk W. Cameron (CEO). [Series A Bridge]

PATENTS/DISCLOSURES

[1] K.W. Cameron and J. Turner, "Systems, devices, and/or methods for managing energy usage", [United States Patent: 8,918,657] [UK Patent: #GB2476606B]

[2] K.W. Cameron and J. Turner, "Portable methods for reducing component energy while guaranteeing performance in computer systems", VTIP Disclosure Number 08.109

[3] R. Ge, X. Feng, and K.W. Cameron, "Automatic, systemic, performance-constrained techniques for reducing power consumption in computer systems", VTIP Disclosure Number 07.029

[4] K.W. Cameron, X. Feng, and H.K. Pyla, "Method and system for correlation and analysis of performance and sensor data in computer systems", VTIP Disclosure Number 07.019.

[5] M. Tolentino, J. Turner, and K.W. Cameron, "Performance-centric runtime system minimizing energy consumption in power-scalable cluster architectures", VTIP Disclosure Number 06.079.

[6] K.W. Cameron, M.A. Cameron, and J.A. Turner, "Method and System for Classification, Analysis, and Presentation of Spatial-Temporal Risk-of-Incidents During Travel", VTIP Disclosure Number 06.060.

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PUBLICATIONS

REFEREED JOURNALS (*=students or former students, [+]supervised post doc or researcher)

Note: These are full publications in peer-reviewed, archived journals that require full manuscript submission (10-15 pages) and provide 3-6 full-length reviews. Thompson-Reuters ISI impact factors listed where available.

[TC] Wang, Y., Furman, S., Hardy, N., Ellis, M., Back, G., Hong, Y. and Cameron, K.W.: A Detailed Historical and Statistical Analysis of the Influence of Hardware Artifacts on SPEC Integer Benchmark Performance. IEEE Transactions on Computers, 15 pages. (To appear: 2024)

[JRSS] Xu, L., Hong, Y., Morris, M. D., and Cameron, K.W.: Prediction for Distributional Outcomes in High-Performance Computing I/O Variability, Journal of the Royal Statistical Society. (To appear: 2024)

[JCST] Cameron, K.W. Adventures Beyond Amdahl's Law: How Power-Performance Measurement and Modeling at Scale Drive Server and Supercomputer Design. J. Comput. Sci. Technol. 38(1): 80-86 (2023).

[TPDS] *Dichev, K. De Sensi, D., Nikolopoulos, D., Cameron, K.W., & Spence, I., Power Log'n'Roll: Power-Efficient Localized Rollback for MPI Applications Using Message, IEEE Transactions on Parallel and Distributed Systems, 33(6): 1276-1288 (2022) **ISI Impact factor: 2.6 (2019)]**

[JQT] Wang, Y., Xu, L., Hong, Y., Pan, R., Chang, T., Lux, T., & Cameron, K. (2022). Design strategies and approximation methods for high-performance computing variability management. JOURNAL OF QUALITY TECHNOLOGY, 16 pages. doi:10.1080/00224065.2022.2035285

[NA] *Lux, T., Watson, *L., Chang, T., Hong, Y., & Cameron, K.W., Interpolation of sparse high-dimensional data, *Numerical Algorithms*, 88(1): 281-313 (2021). **[ISI Impact factor: 2.064 (2019)]**

[QENG] *Xu, L., *Lux, T., *Chang, T., *Li, B., Hong, Y., Watson, L., Butt, A., Yao, D., & Cameron, K.W., Prediction of high-performance computing input/output variability and its application to optimization for system configurations, *Quality Engineering*, Taylor & Francis Group, In press (2021). DOI: 10.1080/08982112.2020.1866203 [**ISI Impact factor: 1.902 (2020)]**

[JPDC] *Xu, L., *Wang, Y., *Lux, T.C.H., *Chang, T.H., *Bernard, J., *Li, B., *Hong, Y., Cameron, K.W., Watson, L.T., Modeling I/O performance variability in high-performance computing systems using mixture distributions. *Journal of Parallel and Distributed Computing*, 139: 87-98 (2020). **[ISI Impact factor: 2.296 (2019)]**

[TOMS] *Chang, T.H., Watson, L.T., *Lux, T.C.H., Butt, A.R., Cameron, K.W. Hong, Y., Algorithm 1012: DELAUNAYSPARSE: Interpolation via a Sparse Subset of the Delaunay Triangulation in Medium to High Dimensions. *ACM Transactions on Mathematical Software*, 46(4): 38:1-38:20 (2020). **[ISI Impact factor: 2.33 (2019)]**

[TPDS] Cameron, K.W., *Anwar, A., ⋆Cheng, Y., *Xu, L., Li, B., *Ananth, U., Lux, T., Hong, Y., Watson, L.T., Butt, A. R. (2019). MOANA: Modeling and Analyzing I/O Variability in Parallel System Experimental Design. *IEEE Transactions on Parallel and Distributed Systems, 30(8): 1843-1856 (2019).* **[ISI Impact factor: 2.173 (2013)]**

[JPDC] *Umar, M., Moore, S. V., Meredith, J. S., Vetter, J. S., & Cameron, K.W. (2018), Aspen-Based Performance and Energy Modeling Frameworks. *Journal of Parallel and Distributed Computing, 120: 222-236*. **[Impact factor: 1.930 (2016)]**

[JPDC] *Li, B., *Mooring, J., Blanchard, S., Johri, A., Leko, M., & Cameron, K. W. (2017). SeeMore: A kinetic parallel computer sculpture for educating broad audiences on parallel computation. *Journal of Parallel and Distributed Computing*, 105(C), 183-199. doi: j.jpdc.2017.01.017 **[Impact factor: 1.930 (2016)]**

[PPL] *Li, B., *Chang, H. -C., *Song, S., *Su, C. -Y., *Meyer, T., *Mooring, J., & Cameron, K. (2014). Extending PowerPack for Profiling and Analysis of High-Performance Accelerator-Based Systems. *Parallel Processing Letters*, *24*(4), 1442001. doi:10.1142/S0129626414420018

[CSRD] *Lively, C., Taylor, V., Wu, X., *Chang, H. -C., *Su, C. -Y., Cameron, K., Moore, S., & Terpstra, D. (2014). E-AMOM: an energy-aware modeling and optimization methodology for scientific applications. *Computer Science - Research and Development*, *29*(3-4), 197-210. doi:10.1007/s00450-013-0239-3

[TPDS] *Li, D., de Supinski, B. R., Schulz, M., Nikolopoulos, D. S., & Cameron, K. W. (2013). Strategies for Energy-Efficient Resource Management of Hybrid Programming Models. *IEEE Transactions on Parallel and Distributed Systems*, *24*(1), 144-157. doi:10.1109/TPDS.2012.95 **[ISI Impact factor: 2.173 (2013)]**

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[JSC] Vishnu, A., *Song, S., Marquez, A., Barker, K., Kerbyson, D., Cameron, K., & Balaji, P. (2013). Designing energy efficient communication runtime systems: a view from PGAS models. *The Journal of Supercomputing*, *63*(3), 691-709. doi:10.1007/s11227-011-0699-9 **[ISI Impact factor: 1.088 (2015)]**

[ITJ] *Chang, H. -C., Kruus, E., Barnes, T. J., Agrawal, A. R., & Cameron, K. W. (2012). Storage Power Optimizations for Client Devices and Data Centers. *Intel Technology Journal*, 16(3), 172-193.

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[PER] *Su, C., *Li, D., Nikolopoulos, D. S., +Grove, M., Cameron, K., & de Supinski, B. R. (2012). Critical path-based thread placement for NUMA systems. *ACM SIGMETRICS Performance Evaluation Review*, *40*(2), 106-112. doi:10.1145/2381056.2381079

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[IJHPCA] *Lively, C., Xingfu Wu., Taylor, V., Moore, S., *Chang, H. -C., & Cameron, K. (2011). Energy and performance characteristics of different parallel implementations of scientific applications on multicore systems. *International Journal of High Performance Computing Applications*, *25*(3), 342-350. doi:10.1177/1094342011414749 **[ISI Impact factor: 1.625 (2013)]**

[IJPED] *Cao, Z., *Easterling, D. R., Watson, L. T., *Li, D., Cameron, K. W., & Feng, W. -C. (2010). Power saving experiments for large-scale global optimisation. *International Journal of Parallel, Emergent and Distributed Systems*, *25*(5), 381-400. doi:10.1080/17445760903492078

[TPDS] *Ge, R., *Feng, X., *Song, S., *Chang, H. -C., *Li, D., & Cameron, K. W. (2010). PowerPack: Energy Profiling and Analysis of High-Performance Systems and Applications. *IEEE Transactions on Parallel and Distributed Systems*, *21*(5), 658-671. doi:10.1109/TPDS.2009.76 **[ISI Impact factor: 2.173 (2013)]**

[IJHPCA] *Song, S., *Ge, R., *Feng, X., & Cameron, K. W. (2009). Energy Profiling and analysis of the HPC Challenge Benchmarks. *International Journal of High Performance Computing Applications*, *23*(3), 265-276. doi:10.1177/1094342009106193 **[ISI Impact factor: 1.625 (2013)]**

[TC] *Tolentino, M. E., *Turner, J., & Cameron, K. W. (2009). Memory MISER: Improving Main Memory Energy Efficiency in Servers. *IEEE Transactions on Computers*, *58*(3), 336-350. doi:10.1109/TC.2008.177 **[ISI Impact factor: 1.723 (2013)]**

[COMP] Feng, W. -C., & Cameron, K. (2007). The Green500 List: Encouraging Sustainable Supercomputing. *Computer*, *40*(12), 50-55. doi:10.1109/MC.2007.445 **[ISI Impact factor: 1.115 (2015)]**

[TC] Cameron, K. W., *Ge, R., & Sun, X. -H. (2007). log(n) P and log(3) P: Accurate analytical models of point-to-point communication in distributed systems. *IEEE Transactions on Computers*, *56*(3), 314-327. doi:10.1109/TC.2007.38 **[ISI Impact factor: 1.723 (2013)]**

[CCPE] *Feng, X., Ge, *R., & Cameron, K. W. (2006). The Argus prototype: aggregate use of load modules as a high-density supercomputer. *Concurrency and Computation – Practice and Experience*, *18*(15), 1975-1987. doi:10.1002/cpe.1040 **[ISI Impact factor: .942 (2014)]**

[PPL] *Byna, S., Cameron, K. W., & Sun, X. -H. (2005). Isolating Costs in Shared Memory Communication Buffering. *Parallel Processing Letters*, *15*(4), 357-365. doi:10.1142/S0129626405002271

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[PE] Sun, X. -H., He, D., Cameron, K. W., & Luo, Y. (2001). Adaptive multivariate regression for advanced memory system evaluation: application and experience. *Performance Evaluation*, *45*(1), 1-18. doi:10.1016/S0166-5316(00)00051-1 **[ISI Impact factor: 1.091 (2013)]**

MAGAZINE ARTICLES

*Note: IEEE Computer Magazine, the flagship publications of the IEEE Computer Society distributed monthly to 85,000+ members. Thompson-Reuters **ISI impact factor was 4.41** in 2019.*

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[COMP] Cameron, K. W. (2014). Energy Efficiency in the Wild: Why Datacenters Fear Power Management. *Computer*, *47*(11), 89-92. doi:10.1109/MC.2014.315

[COMP] Cameron, K.W. (2014). The Evolution of Power Measurement. *Computer*, *47*(3), 78-80. doi:10.1109/MC.2014.75

[HPCW] Cameron, K.W. (2013). HPC Power Efficiency and the Green500. *HPCWire (hpcwire.com)*, November 20, 2013.

[COMP] Cameron, K. W. (2013). Energy Oddities, Part 2: Why Green Computing Is Odd. *Computer*, *46*(3), 90-93.

[COMP] Cameron, K. W. (2013). Energy Oddities, Part 1: Why the Energy World Is Odd. *Computer*, *46*(1), 83-84.

[COMP] Cameron, K. W., & Ge, R. (2012). Generalizing Amdahl's Law for Power and Energy. *Computer*, *45*(3), 75-77. doi:10.1109/MC.2012.92

[COMP] Tolentino, M., & Cameron, K. W. (2012). The Optimist, the Pessimist, and the Global Race to Exascale in 20 Megawatts. *Computer*, *45*(1), 95-97.

[COMP] Lu, Y. -H., Qiu, Q., Butt, A. R., & Cameron, K. W. (2011). End-to-End Energy Management. *Computer*, *44*(11), 75-77.

[COMP] Larrick, R. P., & Cameron, K. W. (2011). Consumption-Based Metrics: From Autos to IT. *Computer*, *44*(7), 97-99.

[COMP] Cameron, K. W. (2011). Computing's Role in Resource Accounting. *Computer*, *44*(3), 91-92.

[COMP] Cameron, K. W. (2010). Green with Envy. *Computer*, *43*(11), 95-96. doi:10.1109/MC.2010.319

[COMP] Cameron, K. W. (2010). A Tale of Two Green Lists. *Computer*, *43*(9), 86-88.

[COMP] Cameron, K. W. (2010). The Challenges of Energy-Proportional Computing. *Computer*, *43*(5), 82-83.

[COMP] Cameron, K. W. (2010). Trading in Green IT. *Computer*, *43*(3), 83-85. doi:10.1109/MC.2010.81

[COMP] Cameron, K. W. (2009). My IT Carbon Footprint. *Computer*, *42*(11), 99-101.

[COMP] Cameron, K. W. (2009). The Road to Greener IT Pastures. *Computer*, *42*(5), 87-89.

[COMP] Cameron, K. W. (2009). Green Introspection. *Computer*, *42*(1), 101-103.

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Note: These are full publications in peer-reviewed, archived proceedings that require full manuscript submission (8-12 pages) and provide 3-6 full-length peer reviews. Acceptance rates listed where available.

[MICRO] Panwar, G., Laghari, M., Bears, D., Liu, Y., Jearls, C., Choukse, E., Cameron, K.W., Butt, A., and Jian, X. Translation-optimized Memory Compression for Capacity. IEEE/ACM International Symposium on Microarchtecture (MICRO 2022). Chicago, IL 992-1011.

[IPDPS] *Wadhwa, B., *Paul, A.K., Neuwirth, S., Wang, F., Oral, S., Butt, A.R, Bernard, J., and Cameron, K.W. Resource Contention Aware Load Balancing for Large-Scale Parallel File Systems. Proceedings of the 2019 IEEE International Parallel and Distributed Processing Symposium (IPDPS 2019). Rio de Janeiro, Brazil: IEEE, **[22% accept rate]**

[CSET] *Yu, X., *Xiao, Y., Cameron, K.W., Yao, D. Comparative Measurement of Cache Configurations' Impacts on Cache Timing Side-Channel Attacks. CSET @ USENIX Security Symposium 2019.

[INFOCOMP] *Li, B., León, E. A., & Cameron, K.W. Understanding Power Measurement Capabilities on Zaius Power9. Proceedings of the 8th International Conference on Advanced Communications and Computation (INFOCOMP 2018). Barcelona, Spain. ***Best Paper Award***

[MASCOTS] *Umar, M., Moore, S., Vetter, J.S. and Cameron, K.W. Prometheus: Coherent Exploration of Hardware and Software Optimizations using Aspen. Proceedings of the 26th IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS 2018). Milwaulkee, Wisconsin: ACM.

[EUROMPI] *Kiril Dichev, Kirk Cameron and Dimitrios Nikolopoulos. Energy-efficient localised rollback after failures via data flow analysis. Proceedings of the 25th ACM European MPI Users' Group Meeting (EuroMPI 2018). Barcelona, Spain: ACM.

[HPDC] *Li, B., León, E. A., & Cameron, K.W. COS: A Parallel Performance Model for Dynamic Variations in Processor

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Speed, Memory Speed, and Thread Concurrency. Proceedings of the 26th ACM Symposium on High-performance Parallel and Distributed Computing (HPDC 2017) (pp. 155-166). Washington, DC: ACM. doi: 10.1145/3078597.3078601 **[19% accept rate]** ***Karsten Schwan Memorial Best Paper Award (1/100 submits)***

[ACSAC] *Kedrowitsch, A., Wang, G., Cameron, K. W., & Yao, D. A First Look: Using Linux Containers for Deceptive Honeypots. Proceedings of the Annual Computer Security Application Conference (ACSAC 2017), San Juan, Puerto Rico, 2017.

[IPDPS] Yan, Y., *Liu, J., Cameron, K. W., & Umar, M. HOMP: Automated Distribution of Parallel Loops and Data in Highly Parallel Accelerator-Based Systems. Proceedings of the 2017 IEEE International Parallel and Distributed Processing Symposium (IPDPS 2017) (pp. 788-798). Orlando, FL: IEEE. doi: 10.1109/IPDPS.2017.99 **[22% accept rate]**

[SBAC] *Umar, M., Meredith, J. S., Vetter, J. S., & Cameron, K. W. (2016). A Study of Power-Performance Modeling using a Domain-Specific Language. Proceedings of the *2016 IEEE International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD 2016)* (pp. 84-92). Los Angeles, CA: IEEE. doi:10.1109/SBAC-PAD.2016.19

[HPPAC] +Correa, S. L., *Umar, M., & Cameron, K. W. (2016). Combining Power and Performance Modeling for Application Analysis: A Case Study using Aspen. Proceedings of the *2016 IEEE International Symposium on Parallel & Distributed Processing Workshops (HPPAC),* (pp. 1150-1159). Chicago, IL: IEEE. doi:10.1109/IPDPSW.2016.84

[MEMSYS] *Su, C. -Y., Roberts, D., León, E. A., Cameron, K. W., Supinski, B. R. D., Loh, G. H., & Nikolopoulos, D. S. (2015). HpMC: An Energy-aware Management System of Multi-level Memory Architectures. B. Jacob (Ed.), Proceedings of the *2015 ACM International Symposium on Memory Systems* (pp. 167-178). ACM. doi:10.1145/2818950.2818974

[ASEE] *Chowdhury, B., Blanchard, S., Cameron, K., & Johri, A. (2015). SeeMore: An Interactive Kinetic Sculpture Designed to Teach Parallel Computational Thinking. Proceedings of the 2015 American Association for Engineering Education Annual Conference & Exposition (pp. 14). ASEE.

[IPDPS] *Chang, H. -C., *Li, B., Back, G., Butt, A. R., & Cameron, K. W. (2015). LUC: Limiting the Unintended Consequences of power scaling on parallel transaction-oriented workloads. Proceedings of the *2015 IEEE International Symposium on Parallel & Distributed Processing,* (pp. 324-333). Hyderabad, INDIA: IEEE. **[21% accept rate]** doi:10.1109/IPDPS.2015.99

[MASCOTS] *Chang, H. -C., *Li, B., +Grove, M., & Cameron, K. W. (2014). How processor speedups can slow down I/O performance. Proceedings of the 2014 *IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS),* (pp. 395-404). IEEE. **[27% accept rate]**

[LSPP] *Li, B., *Chang, H. -C., *Song, S., *Su, C. -Y., *Meyer, T., *Mooring, J., & Cameron, K. W. (2014). The power-performance tradeoffs of the Intel Xeon Phi on HPC applications. Proceedings of the 2014 *IEEE International Parallel & Distributed Processing Symposium Workshop on Large-Scale Parallel Processing (LSPP),* (pp. 1448-1456). IEEE. **[21% accept rate]**

[IPDPS] *You, Y., *Song, S. L., Fu, H., Marquez, A., Dehnavi, M. M., Barker, K., Cameron, K.W., Randles, A. & Yang, G. (2014). MIC-SVM: Designing A Highly Efficient Support Vector Machine For Advanced Modern Multi-Core and Many-Core Architectures. Proceedings of the *2014 IEEE International Symposium on Parallel & Distributed Processing* (pp. 12 pages). Phoenix, AZ: IEEE. doi:10.1109/IPDPS.2014.88 **[21% accept rate]**

[IPDPS] *Song, S., Su, C., Rountree, B., & Cameron, K. W. (2013). A Simplified and Accurate Model of Power-Performance Efficiency on Emergent GPU Architectures. Proceedings of the *2013 IEEE International Symposium on Parallel & Distributed Processing,* (pp. 673-686). Boston, MA: IEEE COMPUTER SOC. doi:10.1109/IPDPS.2013.73 **[21% accept rate]**

[CLUSTER] *Li, B., *Song, S. L., Bezakova, I., & Cameron, K. W. (2013). EDR: An Energy-Aware Runtime Load Distribution System for Data-Intensive Applications in the Cloud. Proceedings of the *2013 IEEE International Conference on Cluster Computing (CLUSTER)* (pp. 8 pages). Indianapolis, IN: IEEE. **[<27% accept rate]**

[XSEDE] Wu, X., *Chang, H. -C., Moore, S., Taylor, V., *Su, C. -Y., Terpstra, D., Cameron, K.W., & Lee, C. W. (2013). MuMMi: Multiple metrics modeling infrastructure for exploring performance and power modeling. In *Proceedings of the ACM Conference on Extreme Science and Engineering Discovery Environment: Gateway to Discovery* (pp. 36). ACM. Also appears in Proceedings of the 2013 *ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, Honolulu, Hawaii, USA, 1-3 July, 2013 (pp. 289-295).*

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[IISWC] *Su, C. -Y., *Li, D., Nikolopoulos, D. S., Cameron, K. W., Supinski, B. R. D., & León, E. A. (2012). Model-based, memory-centric performance and power optimization on NUMA multiprocessors. Proceedings of the *2012 IEEE International Symposium on Workload Characterization* (pp. 164-173). IEEE Computer Society. doi:10.1109/IISWC.2012.6402921

[CLUSTER] *Song, S., +Grove, M., & Cameron, K. W. (2011). An iso-energy-efficient approach to scalable system power-performance optimization. Proceedings of the *2011 IEEE International Conference on Cluster Computing (CLUSTER)* (pp. 262-271). Austin, TX: IEEE COMPUTER SOC. doi:10.1109/CLUSTER.2011.37 **[27% accept rate]**

[EAHPC] *Chang, H. -C., Agrawal, A. R., & Cameron, K. W. (2011). Energy-Aware Computing for Android Platforms. Proceedings of the *2011 IEEE International Conference on Energy Aware High Performance Computing* (pp. 4 pages). Istanbul, TURKEY: IEEE.

[PMBS] *C.-Y. Su, *D. Li, M. Grove, D. Nikolopoulos, K.W. Cameron, B. R. de Supinski and M. Schulz., Critical Path-Based Thread Placement for NUMA Systems, Proceedings of *2011 IEEE/ACM International Workshop on Performance modeling, benchmarking and simulation of high performance computing systems at the ACM/IEEE International Conference on High Performance Computing, Networking, Storage, and Analysis (pp. 2)* Seattle, WA: IEEE.

[CF] *Li, D., Cameron, K. W., Nikolopoulos, D. S., Supinski, B. R. D., & Schulz, M. (2011). Scalable memory registration for high performance networks using helper threads.. C. Cascaval, P. Trancoso, & V. K. Prasanna (Eds.), Proceedings of the *2011 ACM International Conference on Computing Frontiers* (pp. 10). ACM. doi:10.1145/2016604.2016652 **[21% accept rate]**

[IPDPS] *Song, S., *Su, C. -Y., *Ge, R., Vishnu, A., & Cameron, K. W. (2011). Iso-energy-efficiency: An approach to power-constrained parallel computation. Proceedings of the *2011 IEEE International Symposium on Parallel & Distributed Processing* (pp. 128-139). IEEE. **[19% accept rate]**

[GRCOM] Vishnu, A., *Song, S., Marquez, A., Barker, K., Kerbyson, D., Cameron, K., & Balaji, P. (2010). Designing energy efficient communication runtime systems for data centric programming models. Proceedings of the *2010 IEEE/ACM International Conference on Green Computing and Communications & International Conference on Cyber, Physical and Social Computing* (pp. 229-236). IEEE Computer Society. **[31% accept rate]**

[ICPP] *Li, D., *Ge, R., & Cameron, K. (2010). System-level, Unified In-band and Out-of-band Dynamic Thermal Control. Proceedings of the *2010 IEEE International Conference on Parallel Processing (ICPP)* (pp. 131-140). IEEE. **[32% accept rate]**

[IPDPS] *Li, D., Nikolopoulos, D. S., Cameron, K. W., Supinski, B. R. D., & Schulz, M. (2010). Power-aware MPI task aggregation prediction for high-end computing systems. Proceedings of the *2010 IEEE International Symposium on Parallel & Distributed Processing,* (pp. 12). IEEE. doi:10.1109/IPDPS.2010.5470464 **[24% accept rate]**

[IPDPS] *Li, D., Supinski, B. R. D., Schulz, M., Cameron, K. W., & Nikolopoulos, D. S. (2010). Hybrid MPI/OpenMP power-aware computing. Proceedings of the *2010 IEEE International Symposium on Parallel & Distributed Processing,* (pp.12). IEEE. doi:10.1109/IPDPS.2010.5470463 **[24% accept rate]**

[SPRSIM] *Cao, Z., Watson, L. T., Cameron, K. W., & *Ge, R. (2009). A power aware study for VTDIRECT95 using DVFS. Proceedings of the *2009 Spring Simulation Multiconference* (pp. 107-116). Society for Computer Simulation International.

[HPPAC] *Ge, R., *Feng, X., & Cameron, K. W. (2009). Modeling and Evaluating Energy-Performance Efficiency of Parallel Processing on Multicore Based Power Aware Systems. Proceedings of the *2009 IEEE International Symposium on Parallel & Distributed Processing Workshops (HPPAC),* (pp. 1960-1972). Rome, ITALY: IEEE.

[APDCM] *Li, D., *Chang, H. -C., *Pyla, H. K., & Cameron, K. W. (2008). System-level, thermal-aware, fully-loaded process scheduling. Proceedings of the *2008 IEEE International Symposium on Parallel & Distributed Processing Workshops (APDCM),* (pp. 886-892). Miami, FL: IEEE.

[HIPEAC] *Blagojevic, F., *Feng, X., Cameron, K. W., & Nikolopoulos, D. S. (2008). Modeling multigrain parallelism on heterogeneous multi-core processors: A case study of the Cell BE. P. Stenstrom, M. Dubois, M. Katevenis, R. Gupta, & T. Ungerer (Eds.), Proceedings of the *2008 Conference on High Performance Embedded Architectures and Compilers*, Vol. 4917 (pp. 38-52). Gothenburg, SWEDEN: SPRINGER-VERLAG BERLIN. **[29% accept rate]**

[ICDCN] *Li, D., *Huang, S., & Cameron, K. (2008). CG-Cell: an NPB benchmark implementation on cell broadband engine. Proceedings of the *2008 International Conference on Distributed Computing and Networking* (pp. 263-273). Springer

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Berlin Heidelberg. **[16% accept rate]**

[CF] *Tolentino, M. E., *Turner, J., & Cameron, K. W. (2007). Memory-miser: a performance-constrained runtime system for power-scalable clusters. Proceedings of the *2007 ACM International Conference on Computing Frontiers* (pp. 237-246). ACM. **[31% accept rate]**

[ICPP] Cameron, K. W., *Pyla, H. K., & Varadarajan, S. (2007). Tempest: A portable tool to identify hot spots in parallel code. Proceedings of the *2007 IEEE International Conference on Parallel Processing (ICPP)* (pp. 309-316). Xian, PEOPLES R CHINA: IEEE. **[25% accept rate]**

[ICPP] *Ge, R., *Feng, X., Feng, W. -C., & Cameron, K. W. (2007). CPU MISER: A Performance-Directed, Run-Time System for Power-Aware Clusters. Proceedings of the *2007 IEEE International Conference on Parallel Processing (ICPP)* (pp. 147-154). Xian, PEOPLES R CHINA: IEEE. **[25% accept rate]**

[IPDPS] *Feng, X., Cameron, K. W., Sosa, C. P., & Smith, B. (2007). Building the tree of life on terascale systems. Proceedings of the *2007 IEEE International Symposium on Parallel & Distributed Processing* (pp. 1-12). IEEE. **[26% accept rate]**

[IPDPS] *Ge, R., & Cameron, K. W. (2007). Power-aware speedup. Proceedings of the *2007 IEEE International Symposium on Parallel & Distributed Processing* (pp. 1-12). IEEE. **[26% accept rate]**

[HPEC] Nikolopoulos, D. S., & Cameron, K. W. (2007). Synthesizing Parallel Programming Models for Asymmetric Multi-core Systems. Proceedings of the *2007 Workshop on High Performance Embedded Computing* (pp. 1) *MIT Lincoln Lab, Boston, MA.*

[HPPAC] *Tolentino, M. E., *Turner, J., & Cameron, K. W. (2007). An implementation of page allocation shaping for energy efficiency. Proceedings of the *2007 IEEE International Symposium on Parallel & Distributed Processing Workshops* (pp. 1-8). IEEE.

[SC] *Feng, X., Cameron, K. W., & Buell, D. A. (2006). PBPI: a high performance implementation of Bayesian phylogenetic inference. Proceedings of the *2006 IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC),* (pp. 1-10). Tampa, FL: IEEE. doi:10.1145/1188455.1188535 **[23% accept rate, Best Paper Finalist, top 2% of submitted papers]**

[SC] *Ge, R., *Feng, X., & Cameron, K. W. (2005). Performance-constrained distributed dvs scheduling for scientific applications on power-aware clusters. Proceedings of the *2005 IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis* (pp. 34-44). IEEE. **[24% accept rate]**

[IPDPS] *Feng, X., *Ge, R., & Cameron, K. W. (2005). Power and energy profiling of scientific applications on distributed systems. Proceedings of the *2005 IEEE International Symposium on Parallel & Distributed Processing* (pp. 1-10). IEEE. **[34.3% accept rate]**

[HPPAC] *Ge, R., *Feng, X., & Cameron, K. W. (2005). Improvement of power-performance efficiency for high-end computing. Proceedings of the *2005 IEEE International Symposium on Parallel & Distributed Processing Workshops* (pp. 1-8). IEEE.

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[SC] Cameron, K. W., & *Ge, R. (2004). Predicting and evaluating distributed communication performance Proceedings of the *2004 IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis* (pp. 43-53). IEEE.

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[SPDSEC] S. Byna, K. W. Cameron and X.-H. Sun, "Memory-Aware Communication –An Experimental Study with MPI," Proceedings of the *2002 International Workshop on Hardware/Software Support for Parallel and Distributed Scientific and Engineering Computing (pp. 10).*

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Symposium on New Machine Architectures (SympA'6) (pp. 12).

[EUROPAR] Sun, X. -H., & Cameron, K. W. (2000). A statistical-empirical hybrid approach to hierarchical memory analysis. Proceedings of the 2000 *European Conference on Parallel Processing* (pp. 141-148). Springer Berlin Heidelberg.

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[SIAMPP] Sun, X. -H., Cameron, K. W., Luo, Y., & He, D. (1999). A Memory-Centric Characterization of ASCI Applications Via a Combined Approach of Statistical and Empirical Analysis. Proceedings of the 1999 *SIAM Conference on Parallel Processing for Scientific Computing* (pp. 10), SIAM.

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INFLUENTIAL REPORTS AND CONFERENCE PROCEEDINGS

[1] Lawrence Rauchwerger, Kirk W. Cameron, Dimitrios S. Nikolopoulos, Dionisios N. Pnevmatikatos: Proceedings of the ACM 2022 International Conference on Supercomputing, Virtual Event, June 28 - 30, 2022. ACM 2022, ISBN 978-1-4503-9281-5.

[2] Cameron, K.W. and Pruhs, K. (eds.), "NSF Report on the Science of Power Management," pp. 37, submitted to the National Science Foundation August 2010. (Technical Report No. VT/CS-09-19). ***(invited)***

[3] Ashby, S., D. H. Bailey, M. Blackmon, P. Bohrer, K. Cameron, C. DeTar (U. Utah), J. Dongarra, D. Dwoyer, P. Freeman, A. Gheith, B. Gorda, G. Hammer, W. Felter, J. Kepner, D. Koester, S. McKee, D. Nelson, J. Nichols, M. Vahle, J. Vetter, T. Windus, P. Worley, "Performance Modeling, Metrics and Specifications," *Report of the Workshop on The Roadmap for the Revitalization of High-End Computing*, Computer Research Association, Washington, DC, (2003) pp. 59-68. (***invited***)

[4] Vetter, Jeffrey S.; Brightwell, Ron; Gokhale, Maya; McCormick, Pat; Ross, Rob; Shalf, John; Antypas, Katie; Donofrio, David; Humble, Travis; Schuman, Catherine; Van Essen, Brian; Yoo, Shinjae; Aiken, Alex; Bernholdt, David; Byna, Suren; Cameron, Kirk; Cappello, Frank; Chapman, Barbara; Chien, Andrew; Hall, Mary; Hartman-Baker, Rebecca; Lan, Zhiling; Lang, Michael; Leidel, John; Li, Sherry; Lucas, Robert; Mellor-Crummey, John; Peltz Jr., Paul; Peterka, Thomas; Strout, Michelle; Wilke, Jeremiah; "Productive Computational Science in the Era of Extreme Heterogeneity," *Extreme Heterogeneity 2018 - Productive Computational Science in the Era of Extreme Heterogeneity:* Report for DOE ASCR Workshop on Extreme Heterogeneity. United States: N. p., 2018. Web. doi:10.2172/1473756.

BOOK FORWARD

Cameron, K.W., Book Forward for B. Steigerald, C. Lucero, C. Akella, and A. Agrawal, *Energy Aware Computing*, Intel Press, 2012.

BOOK CHAPTERS

[1] Feng, W.-C., Cameron, K.W., and Scogland, T., The Green500 List: A Look Back to Look Forward, In *Contemporary High Performance Computing: From Petascale toward Exascale*, Jeffrey S. Vetter (Editor), Taylor & Francis, 2013. (***invited***)

[2] Li, D.*, Nikolopoulos, D. and Cameron, K.W., Modeling and Algorithms for Scalable and Energy Efficient Execution on Multicore Systems. In *Scalable Computing and Communications*, Wiley & Sons, 2012. (***invited***)

[3] S. Song* and K.W.Cameron, "Green Computing at Scale," *Harnessing Green IT: Principals and Practice*, 2011.

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[4] R. Ge* and K.W. Cameron, "Power-aware, High-Performance Computing," *Green Computing*, Wiley & Sons, 2011.

[5] K.W. Cameron, R. Ge, and X. Feng, "Designing Computational Clusters for Performance and Power," *Advances in Computers*, Elsevier Science BV, Amsterdam, 2007. (***invited***)

[6] S. Byna, K. W. Cameron, and X.-H. Sun, "Quantification of Memory Communication," *High Performance Scientific and Engineering Computing: Hardware/Software Support*, Kluwer Academic Publishers, Boston, MA, (2004) pp. 31-44.

[7] X.-H. Sun, and K. W. Cameron, "A Statistical-Empirical Hybrid Approach to Hierarchical Memory Analysis," *Lecture Notes in Computer Science 1900*. Springer Verlag Publishers, New York, NY, (2000) pp. 141-148. (from EuroPAR 2000)

[8] K. W. Cameron, and Y. Luo, "Instruction-level Microprocessor Modeling of Scientific Applications," *Lecture Notes in Computer Science 1615*, Springer Verlag Publishers, New York, NY, (1999) pp. 29-41. (from ISHPC 99)

[9] Y. Luo and K. W. Cameron, "Instruction-level Characterization of Scientific Computing Applications Using Hardware Performance Counters," *Scientific, Engineering and Desktop Workloads of Workload Characterization: Methodology and Case Studies*, IEEE-CS Press, Los Alamitos, CA, (1999) pp. 90-98.

ART AND TECHNOLOGY EXHIBITIONS

[USHIST] Cameron, K.W. & Blanchard, S. "Lace: Kinetic Computer Sculpture of 30 Microsoft Surface Tablets Demonstrating Distributed Proof of Work Algorithms, Smithsonian National Museum of American History, Washington D.C., April 7-1-, 2022.

[USASEF] Cameron, K.W. & Blanchard, S. "SeeMore: Kinetic Computer Sculpture", Highlights from NSF-funded researchers at the biennial USA Science and Engineering Festival, Washington D.C., April 15-17, 2016.

[SXSW] Cameron, K.W. & Blanchard, S., "SeeMore Exhibit at South by Southwest 2016," SXSW 2016, New York, NY. March 11—20, 2016.

[IMF] Cameron, K.W. & Blanchard, S., "SeeMore Exhibit at International Maker's Faire," IMF 2015, New York, NY. September 26—27, 2015.

[MAKERCON] Cameron, K.W. & Blanchard, S., "SeeMore Exhibit at MakerCon," MakerCon 2015, New York, NY. September 25, 2015.

[SC14] Cameron, K.W. & Blanchard, S., "'lil SeeMore at SC14 Exhibit," SC14, New Orleans, LA. Nov 17 – 20, 2014.

[RHG] Cameron, K.W. & Blanchard, S., "Open at the Source Exhibition," Ruth C. Horton Gallery, May 3 – 18, Ruth C. Horton Gallery, The Moss Center for the Arts, Blacksburg, Virginia. May 3 – 18, 2014.

[SIGGRAPH] Cameron, K.W. & Blanchard, S., "Acting in Translation: SeeMore," SIGGRAPH Art Gallery at the 41st International Conference and Exhibition on Computer Graphics and Interactive Techniques, Vancouver, BC. August 10 – 14, 2014.

SELECT SHORT PAPERS, POSTERS, PANELS, TUTORIALS

[SIGCSE] Godmar Back, Lance Chao, Pratik Anand, Thomas Lux, Bo Li, Ali Raza Butt, Kirk W. Cameron: Teaching Variability in a Core Systems Course: (Abstract Only). SIGCSE 2018: 1085.

[SECON] Tyler H. Chang, Layne T. Watson, Thomas C. H. Lux, Bo Li, Li Xu, Ali Raza Butt, Kirk W. Cameron, Yili Hong: A polynomial time algorithm for multivariate interpolation in arbitrary dimension via the Delaunay triangulation. ACM Southeast Regional Conference 2018: 12:1-12:8

[SECON] Thomas C. H. Lux, Layne T. Watson, Tyler H. Chang, Jon Bernard, Bo Li, Xiaodong Yu, Li Xu, Godmar Back, Ali Raza Butt, Kirk W. Cameron, Danfeng Yao, Yili Hong: Novel meshes for multivariate interpolation and approximation. ACM Southeast Regional Conference 2018: 13:1-13:7

[SPRSIM] Tyler H. Chang, Layne T. Watson, Thomas C. H. Lux, Jon Bernard, Bo Li, Li Xu, Godmar Back, Ali Raza Butt, Kirk W. Cameron, Yili Hong: Predicting system performance by interpolation using a high-dimensional delaunay triangulation. SpringSim (HPC) 2018: 2:1-2:12

[SPRSIM] Thomas C. H. Lux, Layne T. Watson, Tyler H. Chang, Jon Bernard, Bo Li, Li Xu, Godmar Back, Ali Raza Butt, Kirk W. Cameron, Yili Hong: Predictive modeling of I/O characteristics in high performance computing systems. SpringSim (HPC) 2018: 8:1-8:12

[CORR] Kiril Dichev, Kirk W. Cameron, Dimitrios S. Nikolopoulos: Energy-efficient localised rollback after failures via data

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flow analysis. CoRR abs/1806.01611 (2018)

[SC-C] Umar, M., Meredith, J. S., Vetter, J. S., & Cameron, K.W. POSTER: Towards Exascale Computing: An Automatic Hardware-Software Co-design Framework for Aspen, In *2016 SC Companion: IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC-C).* ***Best poster finalist.***

[MASCOTS] *Li, B., *Song, S., Bezakova, I., & Cameron, K. W. (2012). SHORT PAPER: Energy-aware replica selection for data-intensive services in cloud. Proceedings of the 2012 *IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS),* (pp. 504-506). IEEE.

[PACT-SP] *Song, S., & Cameron, K. W. (2012). SHORT PAPER: System-level power-performance efficiency modeling for emergent GPU architectures. Proceedings of the 2012 ACM/IEEE *International Conference on Parallel Architectures and Compilation Techniques (PACT),* (pp. 473-474).

[SC-C] *Song, S. L., *Su, C. -Y., Rountree, B., & Cameron, K. W. (2012). POSTER: Three Steps To Model Power-Performance Efficiency for Emergent GPU-Based Parallel Systems. In *2012 SC Companion: IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC-C)* (pp. 1345-1346). Salt Lake City, UT: IEEE.

[EUROPAR] Di Martino, B., Petrini, F., Benkner, S., Cameron, K., Kranzlmüller, D., Kurzak, J., Pasetto, D. & Träff, J. L. (2010). SHORT PAPER: Multicore and manycore programming. Proceedings of the 2010 *European Conference on Parallel Processing* (pp. 137-138). Springer Berlin Heidelberg.

[SC-C] *Li, D., Cameron, K.W., Nikolopoulos, D.S., Schulz, M., & de Supinski (2009). B.R. POSTER: Model-Based Hybrid MPI/OpenMP Power-Aware Computing. In *2009 SC Companion: IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC-C)* Portland, OR:IEEE.

[SC-C] *Pyla, H.K., *Li, D., & Cameron, K.W. (2007). POSTER: Thermal-aware High-performance Computing Using TEMPEST, In *2007 SC Companion: IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC-C)* Reno: NV:IEEE. **[26% accept rate]**

[SC-C] Cameron, K.W. (2007). PANEL: Is there an HEC energy crisis? In *2007 SC Companion: IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC-C)* Reno: NV:IEEE.

[SOSP-WIP] *Tolentino, M. E., & Cameron, K. W. (2005). WIP: Improving the energy efficiency of high-performance server systems. Proceedings of *2005 ACM Symposium on Operating Systems Principles* (pp. 1). ACM.

[SC-C] Cameron, K.W., Ge, R., Feng, X., Varner, D., & Jones, C. (2004). *POSTER: High-performance, Power-aware Distributed Computing Framework*. In *2004 SC Companion: IEEE/ACM International Conference on High Performance Computing, Networking, Storage, and Analysis (SC-C)* Reno: NV:IEEE. **[32% accept rate]**

[HPCA-T] Luo, Y., Cameron, K.W., Torrellas, J., & Solihin, Y. (2000). TUTORIAL: Performance Modeling using Hardware Performance Counters. *Proceedings of the 2000 IEEE International Symposium on High Performance Computer Architecture (HPCA)* Toulouse FRANCE:IEEE.

[ISCA-T] Cameron, K.W., & Luo, Y. (1999). TUTORIAL: Performance Evaluation using Hardware Performance Counters. *Proceedings of the 1999 IEEE International Symposium on Computer Architecture (ISCA)* Atlanta, GA:IEEE.

CURRENT SYSTEMS/SOFTWARE DESIGNS AND ARTIFACTS

Lace. First-of-its-kind kinetic sculpture of Microsoft Surface tablets that move to demonstrate proof-of-work in a demonstration of distributed algorithms for use in crypto currency applications. An educational project to impress upon non-technical observers the fundamental computer science technologies that underwrite applications in cryptocurrency.

CSGenome. The CSGenome project (http://csgenome.org) evolved from efforts in the NSF sponsored VarSys project and were developed further in the iLORE project. The project involves creating data repositories for computer systems, their performance over time, and their lineage. With the database established, we continue to broaden the coverage while exploring correlation of computer-science advances with advances in hardware and software performance. This project is also a vehicle for broadening participation of students from underrepresented groups in computer systems.

VarViz. Creation of a variability visualization (VarViz) tool. Early on, it was clear that VarSys teams needed a common interface to communicate intentions, needs, findings, and analyses. It was determined that with agreement on a common data interface protocol, the measured data could be automatically visualized for the initial data sets and discussions at weekly meetings. The graphical

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interface was so successful at communication and discovery that it was later modified for use by the systems undergraduate course students.

VarSub. Automated job submission system (VarSub) tool. After deployment of our VarViz tool to project participants but prior to release to undergraduate operating system class students, we determined the need for a system to enable non-experts to submit variability jobs to a compute cluster. The result was VarSub, which was subsequently used by the operating system class to submit their variability experiments.

Wendy. New compute cluster (wendy.cs.vt.edu). With funds from the VarSys grant, SCHEV, and the department we were able to purchase, install, and configure a 20-node, 160-core compute cluster with both mechanical HDDs and non-volatile SSDs. With both GigE and a Infiniband interconnect, this cluster provides a much needed local resource for long-duration variability experiments in isolation.

SeeMore. First-of-its-kind kinetic sculpture of Raspberry Pi computers that move in response to computation. An educational project designed to impress upon non-technical observers the beauty, elegance, and importance of parallel computation.

PowerPack 3.0. PowerPack was created initially as a testbed for evaluating power-aware approaches for their energy and performance impact. PowerPack was the first tool of its kind to give detailed system-level power profiles of applications separated by component (CPU, disk, memory, etc). PowerPack can provide power measurement data synchronized at the functional level of an application. This provides a testbed to evaluate both performance and power effects of system and algorithmic efficiency techniques. The software has been used by groups all over the world from Texas A&M and the University of Tennessee to the University of Oxford in the UK and the University of Catalunya in.

PAST SYSTEMS/SOFTWARE DESIGNS AND ARTIFACTS

SystemG. First-of-its-kind $1.2M Green Supercomputer with over 15,000 temperature and power sensors over 325 nodes. Built with Prof. Varadarajan formerly of Virginia Tech. Sponsored in part by a CRI award from the National Science Foundation. This collection of Mac Pro systems was capable of a sustained 22.8 TFLOPS. The system was designed Cameron and Varadarajan and assembled by dozens of students fueled with pizza and caffeine.

FatBatt. First-of-its-kind commercial software for intelligent battery life management for laptops. Commercially released March 2013. Now retired.

Grano.la. First-of-its-kind commercial software for saving energy without performance loss in laptops, PCs, and servers. Developed by VT spinout company MiserWare. Over 500,000 downloads from 160+ countries during its life. Granola is the culmination and commercialization of 10 years of research in power-aware HPC. Granola uses advanced mathematical, statistical, and machine learning techniques to enable performance SLAs between the user and the power management tool. This ensures users performance and availability expectations are met by the software. Now retired.

Tempest: First-of-its-kind system (*Temp*erature *Est*imator) infrastructure for measuring the temperature of software applications and correlating thermal characteristics to source code. Still available at SourceForge.net.

SysteMISER: System Management Infra-Structure for Energy Reduction includes DVS scheduling techniques (CPU MISER) and power-aware memory techniques (Memory MISER) presently.

Manticore: Sony Playstation 3 cluster running parallel applications on IBM Cell architecture; sponsored in part by Virginia Tech and the National Science Foundation.

PBPI: First large-scale parallel Bayesian-based phylogenetic inference tool; 3 orders of magnitude faster than best available codes at release; sponsored in part by the National Science Foundation and IBM.

DORI: The second-generation, power-aware high-performance cluster built from dual-processor, dual-core AMD systems; sponsored in part by Virginia Tech.

NEMO: The first power-aware, high-performance cluster built from Dell laptop computers; sponsored in part by the National Science Foundation, 2003.

ARGUS: High-density supercomputer built from network load modules; sponsored in part by Ixia Corporation, 2001.

Memory Medic. Global memory checker software for Intel 82450 NX Chipset Validation; sponsored by Intel Corporation, 1996.

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INVITED/REFEREED TALKS SINCE 2002 (Excluding conference paper presentations)

[1] *Invited Talk*, University of Southern California, "Limits of the quantitative approach, or why parallel and distributed system energy management needs to move on," Los Angeles, CA, February 2020.

[2] *Invited Talk,* University of Florida, "Rethinking Quantitative Approaches to Computer System Design in the Power Age," Gainesville, FL, October, 2019.

[3] *Invited Talk,* George Mason University, "Rethinking Quantitative Approaches to Computer System Design in the Power Age," Fairfax, VA, January, 2019.

[4] *Invited Talk*, Microsoft Research, "Revisiting Quantitative Approaches to System Design in the Power Age," Redmond, WA, October, 2018.

[5] *Invited Talk*, Clemson University, "Revisiting Quantitative Approaches to System Design in the Power Age," Clemson, SC, October, 2018.

[6] *Invited Talk*, University of Edinburgh, "Dance of the Dragons: Winning the war of succession in power management," Edinburgh, U.K., June 2018.

[7] *Invited Talk*, University of Central Florida, "Dance of the Dragons: Winning the war of succession in power management," Orlando, FL, September 2017.

[8] ***Keynote***, Symposium on Sensor Network, Systems and Security, "Green Computing: Or how I learned to stop worrying and embrace HPC energy efficiency," Orlando, FL, September 2017.

[9] *Invited Talk*, The Queen's University – Belfast, "Dance of the Dragons: Winning the war of succession in power management," Belfast, U.K., July 2017.

[10] ***Plenary Talk***, NSF CSR PI Meeting, Kirk Cameron, "VarSys: Managing Variability in High-Performance Computing Systems," Orlando, FL, May 2017.

[11] ***Keynote***, High-performace, power-aware computing workshop (HPPAC 2017), "Dance of the Dragons: Winning the war of succession in power management," Orlando, FL, May 2017.

[12] *Invited Talk*, BrainPop Educators, "SeeMore: a Kinetic Parallel Computer Sculpture for Educating Broad Audiences on Parallel Computation," New York, NY, July 2016.

[13] *Panel,* E2SC Workshop, "The Role of Software in Energy Efficiency," November 2015.

[14] ***Keynote***, Exa2green Workshop, "Why High-performance Systems Need a Little LUC", June 2015

[15] *Panel*, "Architect Cloud and HPC for the Big Data Era," Big Data Panel, CCGrid 2014, May 2014.

[16] *Presentation*, "SeeMore: A kinetic sculpture and functional parallel cluster of Raspberry Pi Computers," ECE/CS Beer Bash, October 2014.

[17] *Presentation*, "SeeMore: A kinetic sculpture and functional parallel cluster of Raspberry Pi Computers," Invited Speaker, ICAT Community Playdate, October 2014.

[18] *Interview,* "On Manfred Mohr," Invited Speaker, My Take Talk, School of Performing Arts, October 2014.

[19] *Presentation*, "SeeMore: A kinetic sculpture and functional parallel cluster of Raspberry Pi Computers," Presentation to NSF Director Cordova, ICAT, November 2014.

[20] *Presentation*, "Improving LUC in cloud environments," Invited Speaker, NSF Cloud Workshop, December 2014.

[21] *Presentation*, "Why high-performance systems need a little LUC," Invited Speaker, Future Technologies Group Colloquium Series, Oak Ridge National Laboratory, April 2015.

[22] *Presentation*, "Power and Energy Whack-a-mole in HPC", University of Tennessee – Knoxville, January 2014. (**invited**)

[23] *Presentation,* "The Powers That Be in HPC: Energy Oddities", Presented at the SIAM Conference on Computational Science and Engineering, Boston, MA, February 2013. (**invited**)

[24] *Masterworks Presentation (**Plenary**)*, "Pushing Water Up Mountains: Green HPC and other energy oddities", Presented at the SC 12, Salt Lake City, UT, November 2012. (**invited**)

[25] *BoF, Feng, W. and Cameron, K.W., "*The Green 500", Presented at the SC 12, Salt Lake City, UT, November 2012. (**refereed**)

[26] ***Keynote***, "The Powers That Be in HPC", Energy-Aware High-Performance Computing (ENA-HPC), Hamburg, Germany, September 2012. (**invited**)

[27] *Presentation,* "The Powers That Be in HPC", Queens University of Belfast, Belfast, United Kingdom, September 2012. (**invited**)

[28] *Presentation,* "The Powers That Be in HPC", Oxford University, Oxford, United Kingdom, September 2012. (**invited**)

[29] *Presentation,* "The Powers That Be in HPC", Munich Technical University, Munich, Germany, September 2012. (**invited**)

[30] *Presentation*, "The Powers That Be in HPC", University of Innsbruck, Innsbruck, Austria, September 2012. (**invited**)

[31] *Panel,* Faculty and Student Entrepreneurship, VT Office of Economic Development, August 2012. (invited)

[32] *Presentation,* Being Green in HPC, College of William and Mary Seminar, March 2012. (**invited**)

[33] *Panel,* Technology Start-ups in Virginia, Governor's Small Business Summit, Richmond, VA, October, 2012. (**invited**)

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[34] *Presentation, Adventures in Green Computing*, Energy Aware HPC Minisymposium, SIAM Conference on Parallel Processing for Scientific Computing, Feb. 2012. (**invited**)

[35] *Presentation, Modeling Interactive Effects of Power Performance*, Analysis and Modeling: Techniques and Tools Minisymposium, SIAM Conference on Parallel Processing for Scientific Computing, Feb. 2012. (**invited**)

[36] *Panel, Energy Efficiency BoF*, SC 2011, Washington DC, Nov. 2011. (**invited**)

[37] *BoF, Feng, W. and Cameron, K.W.*, The Green 500, Presented at the SC 11, Seattle, WA, November 2011. (**refereed**)

[38] *Panel*, Governor's Small Business Summit, *Richmond*, VA, Oct. 2011. (**invited**)

[39] ***Plenary**, Adventures in Green Computing: Applications and Algorithms*, Workshop on Green High-Performance Computing, Rutgers University, Oct. 2011 (**invited**)

[40] *Panel, Workshop on Green High-Performance Computing*, Rutgers University, Oct. 2011. (**invited**)

[41] *Presentation*, "Aim Green: Cyber Energy Research @ VT", presented at Air Force Research Laboratory, Syracuse, NY, May, 2011. **(invited)**

[42] ***Plenary**, "MiserWare: A University Spinout for Sustainability",* Sustainable Venture Capital Investment Competition, UNC Kenan-Flagler Business School, Chapel Hill, NC, March, 2011. **(invited)**

[43] *Presentation, "MiserWare: A University Spinout in the Commonwealth",* presented to Virginia Commonwealth CIO Sam Nixon, Richmond, VA, December 2010. **(invited)**

[44] *Poster Presentation, EU-US Frontiers of Engineering Symposium* sponsored by the National Academy of Engineering and the EU Council of Applied Sciences and Engineering, Cambridge, UK, September, 2010. **(invited)**

[45] *Adventures in Green Computing: HPC and Beyond*, LSU Department of Computer Science, November, 2010. *(***invited***)*

[46] *BoF, Feng, W. and Cameron, K.W., The Green 500,* Presented at the SC10, New Orleans, LA, November 2010. (**refereed**)

[47] *Panel, Software for a Sustainable World*, OOPSLA 2010, October 2010. (**invited**)

[48] *A Tale of Two Lists: Green500 and SPECPower*, CCGSC Workshop, September 2010. (**invited**)

[49] *The Past, Present, and Future of Green Computing*, Computer Science Distinguished Lecture Series, Wayne State University, April 2010. (**invited**)

[50] *Panel, Value Opportunities in Green IT,* The GreenIT Economic Workshop, Washington DC, April 2010. (**invited**)

[51] *Panel, Present and Future Directions in Sustainable IT,* SustainIT Workshop, San Jose, CA, February 2010. (**invited**)

[52] *BoF, Feng, W. and Cameron, K.W.*, The Green 500, Presented at the SC 09, Portland, OR, November 2009. (**refereed**)

[53] *Directions in Energy Efficient Computing*, IBM Federal Strategy and Technology Institute Speaker Series, Washington DC, October 2009. (**invited**)

[54] *The Past, Present, and Future of High-Performance, Power-Aware Computing*, Portland State University, July 2009. (**invited**)

[55] *BoF: The Green 500*, (with W. Feng) Presented at the International Supercomputing Conference (ISC), June 2008. (**refereed**)

[56] *BoF: Improving The Green 500*, (with W. Feng) Presented at the International Conference on High Performance Computing and Communications (SC 2008), November 2008. (**refereed**)

[57] *The Past, Present, and Future of High-Performance, Power-Aware Computing*, Thai Grid Computing Conference, September 2008. **(invited)**

[58] *The Past, Present, and Future of High-Performance, Power-Aware Computing*, CCGSC Workshop, September 2008, **(invited)**

[59] *The Green500 and the HPCChallenge Benchmarks*, HPC Challenge Summit, November 2008, **(invited)**.

[60] *PBPI: High Performance Implementations of Parallel Bayesian Phylogenetic Inference on IBM Technologies*, IBM Life Sciences Virtual Expo [Apr 2008]

[61] *Nature, Nurture, and the Green500*, National Science Foundation, Arlington, VA [Jan 2008]

[62] *The HEC Energy Crisis*, University of Florida, Gainesville, Fl [Sep 2007]

[63] *PowerPack and SysteMISER: The past, present, and future of high-performance, power-aware computing*, Merrill Lynch Power Summit, New York, NY [Mar 2007]

[64] *The HPC Energy Crisis*, IBM Research, Austin, TX [Feb 2007]

[65] *Parallel I/O for digital forensics*, Crucial Security. [Dec 2006]

[66] *The HPC Energy Crisis*, The 7th Annual International Workshop on Performance Analysis and Optimization of High-End Computing Systems (APART) at IEEE/ACM SC06. [Nov 2006]

[67] *Crucial Technologies for High-end computing*, Crucial Security. [Aug 2006]

[68] *High-performance, power-aware distributed computing*, Lawrence Livermore National Laboratory. [May 2005]

[69] *High-performance, power-aware distributed computing*, University of Delaware. [Feb 2005]

[70] *High-performance, power-aware distributed computing*, Oak Ridge National Laboratory. [Oct 2004]

[71] *Topics in HPC*, Savannah River National Laboratory. [Aug 2004]

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[72] *High End / Grid Computing*, Software Developers Association. [June 2004]
[73] *SC Grid Computing*, Columbia Chamber of Commerce. [Nov 2003]
[74] *Telecommunication workload characterization*, Intel Corporation [Dec 2002].
[75] *Scalable Performance at USC*, Michelin Corporation visitors. [Nov 2002]
[76] *Toward a unified, practical model of parallel computation*, Illinois Institute of Technology. [April 2002]
[77] *Approaches to Telecom Benchmarking*, Intel Corporation. [March 2002]

RECENT MEDIA COVERAGE

[NPR] "Scientists Studying Why Your Computer Bogs Down," *WVTF Radio (NPR Affiliate)*, Story on $3M NSF funded VarSys Project. http://wvtf.org/post/scientists-studying-why-your-computer-bogs-down - stream/0 (January 19, 2017)
[HPCWIRE] "VT Researcher Receives NSF Grant to Keep Rogue Forces at Bay in HPC," *HPCWire.com*, Story on $3M NSF funded VarSys Project. https://www.hpcwire.com/off-the-wire/vt-researcher-receives-nsf-grant-keep-rogue-forces-bay-hpc/ (December 9, 2016)
[MAGPI] "SeeMore: A Raspberry Pi sculpture that's also secretly a supercomputer," *MagPi Magazine*, Issue #50, Phillip King. http://www.raspberrypi.org/magpi/issues/50/ (September, 2016)
[MAGPI] "SeeMore: Parallel Computing Sculpture," *MagPi Magazine*, Issue #40, Phillip King. https://www.raspberrypi.org/magpi/issues/40/ (December 2015)
[VTUR] "SeeMore: A Living Sculpture of Computational Data Movement," *VT Presidentural Inaugural Highlights Pamphlet*, VA Tech University Relations. https://www.icat.vt.edu/funding/seemore (Oct 2014)
[SIGGRAPH] *Video Production, SeeMore*, ACM SIGGRAPH, Duration: 5:48. *http://www.icat.vt.edu/funding/seemore* (Aug 2014)
Video Production, The Art and Elegance of Parallel Computing, J. Scott Parker, VA Tech University Relations, Duration: 3:15. *http://www.unirel.vt.edu/audio_video/2014/05/050214-caus-SeeMore.html* (May 2014)
[WIRED] *Interview*, Wired Magazine, Related to November 2011 Green500, November, 2011. (**invited**) http://www.wired.com/wiredenterprise/2011/11/supercomputers-turn-green/
[BLOOM] *Interview*, Bloomberg BusinessWeek, Entrepreneur of the Week, October, 2011. (**invited**) http://www.businessweek.com/magazine/kirk-cameron-cuts-computers-power-use-10272011.html
[ABC] *Interview*, ABC Radio (Nationwide distribution), Related to Granola software, April, 2011. **(invited)**
[CBS] *Interview*, WDBJ (CBS Affiliate), Related to IBM Watson on Jeopardy, February, 2011. **(invited)**
[NBC] *Interview*, WSLS (NBC Affiliate), Related to Granola software, February, 2011. **(invited)**

TEACHING – VT/USC RESEARCH SUPERVISION

Ph.D. Advisee Positions Held
Xizhou Feng, 2007, Research Faculty, Clemson University
Rong Ge, 2008, Professor, Clemson University
Matthew Tolentino, 2009, Associate Professor, University of Washington (Tacoma)
Dong Li, 2011, Assistant Professor, University of California – Merced
Song "Leon" Shuaiwen, 2013, Associate Professor, University of Sydney
Hung-Ching Chang, 2015, Intel Research
Chun-Yi Su, 2015, Intel Research
Mariam Umar, 2018, Intel Research
Bo Li, 2018, Meta Research

M.S. Advisee Positions Held
Eles Jones, 2022.
Sam Furman, 2021, PhD Program (4-year GRA), University of Michigan
Nicolas Hardy, 2021, Amazon
Chandler Jearls, 2021, Apple

B.S. Advisee Positions Held
Tanvi Haldankar, 2021, Bloomberg
Sam Furman, 2020, VT BS/MS Program
Chandler Jearls (ECE), 2020, VT BS/MS Program
Nicolas Hardy, 2019, VT MS Program

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Jiayi "J.W. Wang, 2018, Microsoft
Liz Dao, 2018, Microsoft
Luke McCormick, 2017, Amazon

Advisee Awards
Lalitha Kuppa, Adobe Women in Technology Scholarship [2021]
Greg Bolet, Davenport Leadership Scholar [2020]
Song Shuaiwen, Engineers Australia's Most Innovative Engineers [2020]
Bo Li, Virginia Tech Computer Science Outstanding PhD Thesis [May 2019]
Bo Li, LLNL Deputy Director's Science and Technology Excellence in Publication Award [May 2018]
Song Shuaiwen, IEEE-CS TCHPC Award for Excellence for Early Career Researchers in HPC [Nov 2017]
Dong Li, NSF CAREER Award [Jan 2016]
Rong Ge, NSF CAREER Award [Jan 2015]
Chun-Yi Su, Lawrence Livermore Scholar [May 2013]
Dong Li, Virginia Tech Computer Science Outstanding PhD Thesis [May 2011]
Song Shuaiwen 3rd place Torgersen Graduate Student Research Excellence Award [March 2010]
Matthew Tolentino invited to attend NAE Grand Challenge Summit [March 2009]
Chris Jones, UC System GREAT Award (PhD Fellowship at UCLA) [April 2008]
Rong Ge, VT Computer Science Outstanding Ph.D. Thesis, [June 2007]
Joseph Turner, Virginia Tech Cunningham Graduate Fellowship [May 2007]
Joseph Turner, NSF Fellowship Honorable Mention [May 2007, April 2008]
Chris Jones, NSF Fellowship Honorable Mention [May 2007]
Matt Tolentino, Travel grant to attend HPPAC [April 2007]
Rong Ge, Award to attend Computer Architecture Summer School Workshop, Princeton [July 2006]
Rong Ge, USC CSE Outstanding Graduate Student [April 2005]
Allen Michalski, Grant to attend Landau Meeting of Nobel Laureates [June 2005]
Chris Jones, Joseph Turner, Rong Ge, UPE inductees [March 2005]
Chris Jones, Joseph Turner, Phi Beta Kappa inductees [March 2005]
Joseph Turner, Student Volunteer Grant SC 2005 [November 2005]
Xizhou Feng, IPDPS Student Travel Award [June 2005]
Chris Jones, Student volunteer grant SC 2004 [Nov 2004]
Robert Lewis, Runner-up in Mathematics Division of 2004 SC Region II Science and Engineering Fair.

Supervision of Visiting/Research Faculty
Sand Correa (VT), Power-aware expectations, 1/1/15-1/1/16.
Matthew Grove (VT), Power-aware Software and Architectures, 8/10/10 – 5/1/11.

Supervision of Post-Doctoral Research
Rong Ge (VT), Improving Efficiency in Distributed Systems, 1/1/08 – 8/14/08.
Xizhou Feng (VT), High Performance Computing Algorithms and Systems, 5/16/06 – 5/16/07.
Kiril Dichev (QUB), Resiliency via data flow analysis, 7/15/17 – 5/5/18.
Giorgis Georgakoudis (QUB), Advanced modeling of parallel speedup, 7/15/17 – 5/5/18.

[Chair] Supervision of Doctoral Research (PhD Graduates = 10)
Matthew Tolentino (VT), Managing Memory for Power, Performance, and Thermal Efficiency, 1/1/05 – 5/1/09.
Xizhou Feng (USC, co-chair with D.A. Buell), High Performance Computing Algorithms and Systems, 1/1/03 – 5/15/06.
Rong Ge (VT), Power-performance Efficiency in Distributed Systems, 8/16/02 – 12/31/07.
Dong Li (VT), Scalable and Energy Efficient Execution Methods for Multicore Systems, 8/16/06 – 2/15/11.
Song "Leon" Shuaiwen (VT), Power, Performance and Energy Models and Systems for Emergent Architectures, 8/16/06 – 3/15/13.
Hung-Ching Chang (VT), Power-Performance Efficiency in I/O, 8/16/07 – 5/15/15.
Chun-Yi Su (VT), Power-Performance Analysis of HPC Memory Systems, 8/16/07 – 5/15/15.
Bo Li (VT), Modeling and Runtime Systems for Coordinated Power-Performance Management, 8/16/12 – Present.
Mariam Umar (VT), Extending the Aspen Framework to Support Power and Energy Modeling, 1/15/15 – 5/5/18.
Jon Bernard (VT), TBD, 8/16/17 – Present.
Greg Bolet (VT), TBD, 8/16/20 – Present.

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Danny Tsang (VT), TBD, 8/16/22 – Present

[Chair] Supervision of Masters Research (M.S. Graduates = 12)
Eles Jones (VT), "LACE: A Kinetic Decentralized Ledger Sculpture for Educating Broad Audiences on Blockchain Computing, 8/15/21 – 8/1/22.
Sam Furman (VT), CPU Performance and Lineage Repository, 1/15/19 – 8/15/21.
Nicolas Hardy (VT), Computer Systems Performance and Lineage Repository, 1/15/19 – 5/15/21.
Chandler Jearls (VT), Hardware memory compression, 1/15/19 – 5/15/21.
Uday Ananth (VT), Studies of system variability, 1/15/15 – 5/15/17.
Sergio Bernales (VT), Orchestration of a Parallel Kinetic Sculpture of Raspberry Pi's, 9/1/13 – 12/15/14. M.S. CS.
Song "Leon" Shuaiwen (VT), Thermal-aware High-performance Computing, 8/16/06 – 5/1/09. M.S. CS.
Hari K. Pyla (VT), Thermal Profiling Tools for Emergent Systems, 1/15/06 – 6/1/07. [w/ Varadarajan] M.S. CS.
Rong Ge (USC), Performance Evaluation/Prediction of Communication Overhead, 8/16/02 – 5/1/05. M.S. CE.
Chip Aaron (USC), Thermal Characteristics of Advanced DRAM Architectures, 9/1/04 – 5/1/05. M.S. CE.
Drew Varner (USC), Evaluation of High-performance Power-aware Clusters, 1/1/04 – 5/1/05. M.S. CE.
Vidya Kolipaka (USC), Performance Evaluation of Intel's Softswitch Architecture, 5/1/02 – 6/1/03. M.S. CE.
Raghuram Renduchintala (USC), Advanced Use of the Simplescalar Simulator, 7/1/02 – 12/15/02. M.S. CE.

Supervision of Undergraduate Research (Select list, B.S. students mentored = dozens)
* I am executive director of BURGS. As such, I support and mentor 20-25 undergrads per year on research.
* See: https://cs.vt.edu/research/research-areas/systems/burgs.html for current students and alumni.
Chandler Jearls, VT. Large-scale, cross-platform, system benchmarking. 9/15/17 – 12/20/18.
Samuel Furman, Research Project: Protocols for cross-system performance comparisons. 9/15/17 – 12/20/18.
Nicolas Hardy, Research Project: Protocols for cross-system performance comparisons. 9/15/17 – 12/20/18.
Jiayi "J.W. Wang, Research Project: Protocols for cross-system performance comparisons. 9/15/17 – 5/15/18.
Liz Dao, Research Project: Protocols for cross-system performance comparisons. 9/15/17 – 5/15/18.
Luke McCormick Research Project: Protocols for cross-system performance comparisons. 9/15/17 – 12/15/17.
Zoe Smith, Research Project: Protocols for cross-system performance comparisons. 9/15/17 – 12/15/18.
Barrett Latimer, VT. Performance and power analysis of the Raspberry Pi Computers. 9/15/17 – 12/15/17.
Kelsey, Farenholtz, VT. Design and implementation of a Raspberry Pi Cluster, 10/15/13 – 5/15/15.
John Mooring, VT: Design and implementation of a Raspberry Pi Cluster, 1/1/13 – 8/15/14.
Timmy Meyer, VT: Power-performance benchmarking on HPC Clusters, 1/1/13 – 5/15/15.
Chris Jones, Honors College Research: Evaluation of Power-aware Clusters, 1/1/04 – 5/15/06.
Joseph Turner, Honors College Research: Hardware counter evaluation of high-end systems, 1/1/04 – 12/15/06. B.S. CE.
Tyler Maxwell, Research Project: Implementation & analysis of Intel Softswitch Architecture, 1/1/02 – 8/30/02. B.S. CE.

Supervision of High School Students
Barrett Lattimer, Blacksburg High School, Summer 2016, Project: Programming SeeMore Kinetic Sculpture
Liam Lawrence, Blacksburg High School, Summer 2016, Project: Programming SeeMore Kinetic Sculpture
Kevin Hencke, Blacksburg High School, Summer 2006 Project: Empirical Study of Memory Hierarchies, B.S. UMD.
Robert Lewis, Dreher High School, Project: Building a Beowulf, entrant in 2004 SC Region II Science and Engineering Fair.

[Member] Advisement Committees
* I am a member of 3-5 CS or ECE PhD committees at any given time. I can provide a full list if needed.
Thomas Lux, Ph.D. [2020]
Tyler Chang, Ph.D. [2020]
Tong Zhang, Ph.D. [2019]
Luna Xu, Ph.D. [2019]
Yue Cheng, Ph.D. [2017]
Guanying Wang, PhD – VT [2014]
Alensandr Khasymski, PhD – VT [2014]
David Easterling, PhD – VT [2013]
Ruslan Nikolav, PhD – VT [2013]
Mustafa Rafiki, PhD – VT [2013]
Balaji Subramaniam, M.S. – VT [2013]
Filip Balgojevic, PhD – VT [2009]

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Amine Chigani, PhD – VT [2009]
Rajesh Sudarsan, PhD – VT [2010]
Matthew Curtis-Maury, PhD – VT [2008]
Mehmet Belgin, PhD – VT [2010]
Scott Scheider, Ph.D. – VT [2011]
John Linford – M.S. VT [2009]
Amine Chigani, M.S. – VT [2007]
Ankur Shah, M.S. – VT [2008]
Ashwin Aji, M.S. – VT [2008]
Veena Basavaraj, M.S. – VT [2006]

TEACHING – VT CS/ECE & USC CSE COURSES AND CLASS SIZE

Course Subject	Course Code	Course Name	Credit Hours	Date	# of students
CS	4284	Systems and Networking Capstone	3.0	Spring 2023	25
CS	6204	Advanced Topics in Systems	3.0	Fall 2021	10
CS	4284	Systems and Networking Capstone	3.0	Spring 2021	40
CS	4284	Systems and Networking Capstone	3.0	Spring 2020	30
CS	4284	Systems and Networking Capstone	3.0	Spring 2019	25
CS	4234	Parallel Computation	3.0	Fall 2018	20
CS	4284	Systems & Networking Capstone	3.0	Fall 2016	16
CS	4234	Parallel Computation	3.0	Fall 2015	24
CS	4284	Systems & Networking Capstone	3.0	Fall 2015	14
CS	4234	Parallel Computation	3.0	Fall 2014	37
CS	6204	Advanced Topics in Systems	3.0	Fall 2014	15
CS	5504	Computer Architecture	3.0	Spring 2014	13
ECE	5504	Computer Architecture	3.0	Spring 2014	25
CS	4284	Systems & Networking Capstone	3.0	Fall 2013	16
CS	5504	Computer Architecture	3.0	Spring 2013	24
ECE	5504	Computer Architecture	3.0	Spring 2013	13
CS	2506	Intro to Computer Organization	3.0	Fall 2012	98
CS	2506	Intro to Computer Organization	3.0	Spring 2012	71
CS	6204	Advanced Topics in Systems	3.0	Spring 2012	15
CS	4234	Parallel Computation	3.0	Fall 2011	25
CS	2506	Intro to Computer Organization	3.0	Spring 2011	72
CS	5504	Computer Architecture	3.0	Spring 2011	7
ECE	5504	Computer Architecture	3.0	Spring 2011	4
CS	4234	Parallel Computation	3.0	Fall 2010	23
CS	2506	Intro to Computer Organization	3.0	Fall 2009	36

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CS	4504	Computer Organization	3.0	Spring 2009	3
CS	5504	Computer Architecture	3.0	Spring 2009	15
ECE	4504	Computer Organization	3.0	Spring 2009	3
ECE	5504	Computer Architecture	3.0	Spring 2009	8
CS	6204	Advanced Topics in Systems	3.0	Fall 2008	4
CS	4504	Computer Organization	3.0	Spring 2008	9
CS	5504	Computer Architecture	3.0	Spring 2008	13
ECE	4504	Computer Organization	3.0	Spring 2008	10
ECE	5504	Computer Architecture	3.0	Spring 2008	12
CS	4504	Computer Organization	3.0	Spring 2007	7
CS	5504	Computer Architecture	3.0	Spring 2007	26
ECE	4504	Computer Organization	3.0	Spring 2007	9
ECE	5504	Computer Architecture	3.0	Spring 2007	1
CS	4504	Computer Organization	3.0	Spring 2006	7
CS	6204	Advanced Topics in Systems	3.0	Spring 2006	10
ECE	4504	Computer Organization	3.0	Spring 2006	17
CSE	6xxx	Power Conscious Computing	3.0	Spring 2005	9
CSE	4xxx	Computer Architecture	3.0	Fall 2004	26
CSE	5xxx	Advanced Computer Architecture	3.0	Spring 2004	6
CSE	4xxx	Computer Architecture	3.0	Fall 2003	25
CSE	6xxx	Performance Analysis	3.0	Spring 2003	8
CSE	4xxx	Computer Architecture	3.0	Fall 2002	31
CSE	4xxx	Computer Architecture	3.0	Fall 2001	24

SERVICE –BROADER NATIONAL AND INTERNATIONAL COMMUNITIES

EDITORIAL POSITIONS

Associate Editor in Chief: IEEE Transactions on Parallel and Distributed Systems , (2022– present).
Associate Editor: IEEE Transactions on Parallel and Distributed Systems , (2018 – 2022).
Associate Editor: Journal of Parallel and Distributed Computing , (2015 – 2025).
Associate Editor: IEEE Computer , (2014 – 2017).
Editorial Board: IEEE Computer , (2009 – 2014); editor of Green IT Column (2009 – 2014).
Editorial Board, Sustainable Energy Development Book Series, (2011 – present).
Guest Editor: *IEEE Transactions on Parallel and Distributed Systems*, Special Issue on Power-Aware Parallel and Distributed Systems (PAPADS), (2007 – 2008).

ELECTED COMMITTEES

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Elected Member: NERSC User's Group Executive Committee (2007-2010).

INVITED INTERNATIONAL CONFERENCE ORGANIZATION POSITIONS

Conference General Co-Chair, ACM/IEEE ccGrid 2024 (2023-2024)
Conference General Chair, ACM eEnergy 2023, (2022-2023) "ACM Outstanding Service Award"
Conference General Co-Chair, ACM International Conference on Supercomputing (ICS 2022) (2021-2022) "ACM Outstanding Service Award"

Conference Steering Committee, IEEE ccGrid (2024-)
Conference Steering Committee, ACM eEnergy (2023-)
Conference Steering Committee, ACM International Conference on Supercomputing (ICS 2022) (2022-)

Technical Program Vice-Chair: CCGrid 2016 (Architecture, 2015-2016), CCGrid 2013 (Architecture, 2012-2013)
Technical Program Vice-Chair: SC 2015. (2014-2015)
Technical Program Co-Chair: CCGrid 2014. (2012-2014)

Workshop Co-Chair: Workshop on Energy Efficient Supercomputing (E2SC), 2012-2017.
Workshop Co-Chair: International Parallel and Distributing Processing Symposium (IPDPS), 2015-2016.
***Workshop Co-Chair*:** Workshop on Variability in Systems (VarSys). (2015-2016).
***Workshop Co-Chair*:** Workshop on Science of Power Management, Sponsored by NSF. (2008-2009).
Workshop Co-Chair: High-Performance Power-Aware Computing Workshop (HPPAC), 2007.

Publicity Chair: ACM International Conference on Supercomputing, 2011.

Society Steering Committee, IEEE Technical Committee on Scalable Computing – Technical Area of Green Computing (2011-).
Workshop Steering Committee, The First International Workshop on Energy Consumption and Reliability of Storage Systems (ERSS) 2011.
Conference Steering Committee, IEEE/ACM International Conference on Green Computing and Communications (GreenCom), 2009-present.
Workshop Steering Committee, High-performance, power-aware computing workshop (HPPAC), 2005-present.
Workshop Steering Committee, International workshop on performance analysis and optimization of high-end computing systems Workshop (APART), 2007.

Session Chair, 29th International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2020)
Session Chair: 2018 Extreme Heterogeneity Workshop.
Session Chair: SC 2014**,** SC 2017, SC 2018, SC 2019.
Session Chair (Breakout Session): NSF CISE PI Workshop, May 2017, Orlando, FL.
Session Chair: MASCOTS 2014.
Session Chair, National Academy of Engineering Frontiers of Engineering Indo-American Symposium, 2014.
Session Chair, International Parallel and Distributing Processing Symposium (IPDPS), 2011.
Session Chair, IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC), 2009.
Session Chair, High-performance, power-aware computing workshop (HPPAC), 2005-2010.
Session Chair, IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC), 2005.
Session Chair, Workshop on Hardware/Software Support for Parallel and Distributed Scientific and Engineering Computing (SPDSEC), 2002.
Session Chair, International Conference on Parallel and Distributed Processing Techniques and Applications (PDPTA), 1999.

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INTERNATIONAL CONFERENCE TECHNICAL PROGRAM COMMITTEES (MEMBER)

2024 USENIX Annual Technical Conference (USENIX ATC '24)
33rd International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2024)
2023 International Parallel and Distributed Processing Symposium (IPDPS)
2022 International Parallel and Distributed Processing Symposium (IPDPS)
2022 International Conference on Distributed Computing Systems (ICDCS)
2021 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
2021 International Parallel and Distributed Processing Symposium (IPDPS)
30th International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2021)
2020 International Conference on Parallel Processing (ICPP 2020)
29th International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2020)
2020 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
2020 International Parallel and Distributed Processing Symposium (IPDPS)
28th International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2019)
2019 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
27th International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2018)
2017 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
2016 European Conference on Parallel Computing (EuroPar 2016)
2016 USENIX Workshop on Cool Topics in Sustainable Datacenters (CoolDC)
2015 IEEE/ACM International Conference on Parallel Architecture and Compilation Techniques (PACT 2015)
2014 International Parallel and Distributed Processing Symposium (IPDPS)
2014 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
2013 ACM SIG CHI [ad hoc reviewer]
2013 IEEE HiPC
22nd International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2013)
2012 IEEE HiPC
2012 IEEE CLUSTER
2012 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
21st International ACM Symposium on High-Performance Parallel and Distributed Computing (HPDC 2012)
2011 High Performance Computing Conference (HiPC)
2011 Workshop on Energy Consumption and Reliability of Storage Systems (ERSS)
2011 International Workshop on Power Measurement and Profiling (PMP)
2011 International Conference on Green Information Technology (GREEN IT)
2010 International Green Computing Conference (IGCC)
2010 European Conference on Parallel Computing (EuroPar 2010)
2010 IEEE Cluster
2010 Workshop on Energy Efficient Design (WEED)
2010 USENIX Workshop on Sustainable Information Technology (Sustain IT)
2010 Workshop on high-performance, power-aware computing (HPPAC)
2009 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
20th IEEE/ACM International Conference on Parallel Architecture and Compilation Techniques (PACT)
2009 Workshop on high-performance, power-aware computing (HPPAC)
2009 International Parallel and Distributed Processing Symposium (IPDPS)
2008 International Conference on Parallel Processing (ICPP)
2008 Workshop on high-performance, power-aware computing (HPPAC)
2007 International workshop on performance analysis and optimization of high-end computing systems (APART)
2007 International Conference on Parallel Processing (ICPP)
2007 International Conference on Parallel and Distributed Computing Networks (PDCN)
2007 ACM Southeastern Conference (ACMSE)
2007 Workshop on high-performance, power-aware computing (HPPAC)
2006 ACM Southeastern Conference (ACMSE)
2006 Workshop on high-performance, power-aware computing (HPPAC)
2005 IEEE/ACM International Conference for High-performance Computing Networking, Storage, and Analysis (SC)
2005 Workshop on high-performance, power-aware computing (HPPAC)
2004 International Conference on Parallel Processing (ICPP)

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2002 Workshop on Hardware/Software Support for Parallel and Distributed Scientific and Engineering Computing (SPDSEC)

NATIONAL AND INTERNATIONAL OUTREACH ACTIVITIES

Co-founder: CS/root Entrepreneurial Hub, 2022-present.
Co-founder: CSGenome Project, 2018-present.
Co-founder: Green500 list of power efficient supercomputers, 2006-present. (Now merged with Top500.org)
Contributing Member: SPECPower Working Group 2005-present.
Awards Committee: Green Enterprise IT Awards, international competition for achievement in data center energy efficiency held annually at the IT Symposium, 2009-2012.
Session Chair: "Cloud, Serverless Computing, and HPC" session at NSF CISE PI Meeting, November, 2019.
Invited Participant, AFRL Cyber Energy Summit, 2011.
Invited Participant**:** 2010 US/EU Frontiers of Engr. Symposium, September 2010.
Invited Participant**:** EPA Stakeholders Workshop 2008.
Invited Participant**: 2**008 US Frontiers of Engr. Symposium, September 2008.
Invited Participant**:** EPA Tier II Energy Star Workshop 2007.
Invited Participant**:** National Security Agency Advanced Computing Systems (ACS) Workshop 2007.
Invited Participant**:** Interagency High-End Computing Revitalization Task Force, organized by the National Science and Technology Council 2003.

CONSULTING ACTIVITIES

Expert Consult: Goldberg Sagalla, New York, NY, 2023-present.
Expert Consult: Decision Detective, SF Bay Area, California, 2015-2016.
Founder and CEO: MiserWare, Inc. Power management software company, 2007-2014.
Expert Witness: Commonwealth of Virginia, Office of the Attorney General, 2006-2007.
Expert Consult: Oracle via Oblon – Spivak, Alexandria, Virginia, 2014.
Advisory Board Member: READEX Project, Led by Technical University Munich (Germany), Funded by European Union's Horizon 2020 research and innovation programme [No. 671657], 2015-2018.
Advisory Board Member: U.S. General Services Administration (GSA) Technical Operations (GTO) Technical Advisory Board (TAB) – technical advisory board member for GSA GTO $237M contract awarded to AAC, Inc. 2014-2019.

SERVICE –UNIVERSITY COMMUNITY

VIRGINIA TECH INNOVATION CAMPUS, COLLEGE, AND UNIVERSITY ACTIVITIES

AVP Academic Affairs and Lead Faculty: Innovation Campus (2022-)
AVP Finance and Operations Search Chair *(2023-)*
Member: LINK Search Committee (2021)
Member: Innovation Campus Faculty Advisory Board (2020-2022)
Member: Innovation Campus Building Planning Committee (2020-2022)
Chair: CS Department Head Review Committee (2020-2021)
Member: COE Diversity Committee (2012-2016)
Director: stack@CS Center for Computing Systems (2013-2022)
Committee member: Associate Dean Search Committee (2010-2011), DH Review Committee Chair (2020-2021)
Faculty Mentor (2011): Jason Holliday (Forestry), Jules White (ECE), and Mantu Hudait (ECE).

VIRGINIA TECH DEPARTMENT OF COMPUTER SCIENCE OUTREACH ACTIVITIES

Associate Department Head, Graduate Studies (2014-2017), Research and Engagement (2018-2022)
HPC Lead, Virginia Tech Computer Science Alliance, coordinate activities with HBCU colleges in region, (2007-2010).
Founder and Chair, NSF CAREER Internal Review Committee, setup mock panels for junior faculty, (2006-2008).

VIRGINIA TECH DEPARTMENT OF COMPUTER SCIENCE ACTIVITIES

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Director/Lead, Alumni and Corporate Relations, [2019-2022]
Director/Lead, Marketing and Communications, [2019-2022]
Director/Lead, Blockchain Initiative, [2018-2022]
Chair, Systems Faculty Search Committee [2018-2019]
Chair, CS Personnel (Tenure and Promotion) Committee, [2015-2016]
Member, CS Director of Undergraduate Studies Search [2021]
Member, CS Director of Graduate Studies Search [2021]
Member, CS Personnel (Tenure and Promotion) Committee, [2010-2011, 2013-2015, 2016-2018]
Member, CS Executive Committee, [2014-]
Member, CS Tech Lead Search [2014]
Member, CS External Relations Search [2014]
Member, CS Business Manager Search [2015]
Chair, Graduate Program Committee (2014-2017)
Chair, Systems Faculty Search Committee (2012-2013)
Faculty mentor for: Ali Butt (2010 – 2013), Dongyoon Lee (2014-), Danfeng Yao (2013-), Godmar Back (2013-), Thang Hoang (2020-), Matt Hicks (2019-), Bo Ji (2020-), Xun Jian (2019-), Kurt Luther (2016-)
Committee member, 40th Anniversary Event Committee (2011), 50th Anniversary Committee (2020-2021)
Course coordinator, CS 4504 (2005 – 2015)
Committee member, Marston Entrepreneurial Fund Committee (2007 – 2010)
Chair, Computer Resources Committee (2008 – 2010)
Member, Department Head Search Committee (2007-2008)
Member, Systems Faculty Search (2006, 2010, 2011-2012, 2013-2014)
Chair, Systems Qualifier Committee (2007-2008)
Member, Systems Qualifier Committee (2005-2008, 2016-2017)
Member, Graduate Admissions Committee (2006-2008, 2011-2014)

UNIVERSITY OF SOUTH CAROLINA ACTIVITIES

Faculty mentor for Jijun Tang (2004-2005)
Founder and Chair, NSF CAREER Internal Review Committee, setup mock panels for junior faculty, (2003-2005).
Founder and Chair, USC CSE Distinguished Lecture Series, (2003-2005).
Member, USC CSE Faculty Search Committee (2003-2005)
Member, USC Research and Productive Scholarship Committee (2004)
Member, USC CSE Computing Infrastructure Committee (2003-2005)

SERVICE –NATIONAL AND INTERNATIONAL REVIEWING ACTIVITIES

PROPOSAL REVIEWER

Review Panel, Deutsche Forschungsgemeinschaft (DFG), German Research Foundation
NSF BLUE RIBBON PANEL (CISE Expeditions, 7 manuscripts, $15M/proposal)
NSF CAREER Panel (~10 manuscripts), 2004, 2007, 2009, 2013-2022.
NSF CCF Panel (~10 manuscripts), 2015-2016, 2020, 2021.
NSF CNS Panel (~10 manuscripts), 2015-2016, 2020, 2022.
DOE Office of Science Ad Hoc Reviewer, (1 manuscript), 2014.
NSF Ad Hoc Reviewer, (2 manuscripts), 2014, 2018.
Engineering and Physical Sciences Research Council (UK), 2013.
University of Cyprus, 2012.
NSF SBIR Panel (8 manuscripts), 2010.
Department of Energy Early Career Panel (10 manuscripts), 2009.
NSF Ad Hoc Reviewer (1 manuscript) 2009.
NSF Expeditions Panel (9 manuscripts), 2008.
Ontario Research Fund, Canada, (4 manuscripts) 2007.
NSF CPA Panel (10 manuscripts), 2007.
Ontario Research Fund, Canada, (4 manuscripts) 2006.

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NSF DDDAS Panel (12 manuscripts), 2005.
NSF REU Panel (11 manuscripts), 2005.
NSF ACR Panel (10 manuscripts), 2003.
NSF ITR Panel (12 manuscripts), 2003.

TEXTBOOK REVIEWER

Digital Principals and Design, 1e (702 pgs, McGraw-Hill).

JOURNAL MANUSCRIPT REVIEWER

** I don't really keep this up to date anymore. Too many to count.
IEEE Transactions on Computing
IEEE Transactions on Parallel and Distributed Systems
IEEE Micro
IEEE Computer
ACM Transactions on Computer Systems
ACM Journal of Emerging Technologies
ACM Computing Surveys
IBM Systems Journal
Journal of Future Generation Computing Systems
Journal of Systems Software
Journal of Parallel and Distributed Computing
IEEE Internet Computing
IEEE Transactions on Mobile Computing
Integration: The VLSI Journal
The Computing Journal
Parallel Computing
International Journal of High-Performance Computing
Frontiers of Computer Science China

SERVICE – INTERNATIONAL PROFESSIONAL MEMBERSHIPS

Distinguished Scientist, Association of Computing Machinery (ACM)
Fellow, Institute of Electrical and Electronics Engineers (IEEE)
Upsilon Pi Epsilon (UPE) Honor Society for the Computing Sciences

Graphite Charging Company Exhibit 2006
IPR2024-00387

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner,

v.

GRAPHITE CHARGING COMPANY, LLC,

Patent Owner.

Case IPR2024-00387

U.S. Patent No. 8,103,391

DEPOSITION OF C. ARTHUR MacCARLEY

Thursday, October 17, 2024

REPORTED BY: RENEE HARRIS, CSR 14168, CCR, RPR

JOB NO. 6969930

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UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,
v.
GRAPHITE CHARGING COMPANY, LLC,
Patent Owner.

Case IPR2024-00387
U.S. Patent No. 8,103,391

Deposition of C. ARTHUR MacCARLEY the witness herein, appearing remotely from Palo Alo, California at 8:09 a.m. Pacific Daylight Time, on Thursday, October 17, 2024, before Renee Harris, California Certified Shorthand Reporter No. 14168, New Jersey Certified Court Reporter No. 30XI00241200, and Registered Professional Reporter.

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ON BEHALF OF PATENT OWNER:
DEVLIN LAW FIRM
BY: JASON SHAPIRO, ESQ.
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Also Present:
Ashraf Fawzy (remotely)

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EXHIBITS

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Exhibit 1001	U.S. Patent 8,103,391	9
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Exhibit 1	Borda, M - Rapid Battery Interchange System March 5, 2012	77
Exhibit 2	Cal Poly Racing Partners	82

PALO ALTO, CALIFORNIA;
THURSDAY, OCTOBER 7, 2024;
8:09 A.M., PDT;

C. ARTHUR MacCARLEY,
called as a witness and having been first duly sworn by the Certified Shorthand Reporter, was examined and testified as follows:

EXAMINATION

BY MR. SHAPIRO:

Q. Good morning, Dr. MacCarley.
My name is Jason Shapiro. I'm with the Devlin Law Firm. We represent the Patent Owner, Graphite Charging Company IN Inner Partes Review Number 2024-00387, and this regards U.S. Patent No. 8,103,391.
Could you please state your full name for the record?
A. My name is Carl, spelled C-a-r-l, Arthur, A-r-t-h-u-r, MacCarley.
But I go by "Art."
Q. Thank you.
Have you ever been deposed in connection with an inner partes review before?

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A. Yes, sir.
Q. Okay. That's good.
Then I'll just briefly go over some ground rules to make sure we're on the same page.
Is that okay?
A. Of course.
Q. During the deposition, I'm going to ask you a series of questions. My questions and your answers will be recorded by the court reporter.
And to help the court reporter do her job, it's important that we don't talk over each other. So I'm going to ask that you try to stop and listen while I'm speaking, and I'll do the same for you.
Is that okay?
A. Understood.
Q. It's also important that you speak up and answer my questions orally because the court reporter can't record you nodding or shaking your head. Okay?
A. Yeah.
Q. And if you don't understand a question for any reason, just let me know, and I'll try to ask it a different way.
Does that sound fair?

A. Yes.
Q. And your attorney may object after I ask a question. If that happens, you must still answer the question unless your attorney instructs you not to answer because of privilege.
Do you understand?
A. I understand.
Q. And we'll try to take a break every hour or so. And if you want to take a break at some other time, just let me know, and we'll take one.
The only caveat is that if I've already asked you a question, I'd like to get your answer before we take a break.
Is that all right?
A. I understand.
Q. And do you understand that you may not consult with or confer with your attorney regarding the substance of the deposition at any time during the deposition, including any breaks?
A. Yes. I have been informed.
Q. And you understand that you are under oath, and you are, therefore, legally obligated to give truthful testimony?
A. Yes.
Q. Is there any reason, medical or otherwise, why you cannot testify fully, truthfully, and accurately today?

A. Not that I'm aware of.
Q. Okay. A couple housekeeping matters.
So if I refer to the "'391 patent," do you understand that I'm referring to U.S. Patent No. 8,103,391?
A. B2, yes.
Q. And if I refer to "this IPR," do you understand that I'm referring to IPR 2024-00387?
A. Yes.
Q. Do you have any applications running on your -- well, do you -- you're in front of a computer; correct?
A. I am. I'm only looking at you.
Q. All right.
A. I have nothing running.
Q. So no other applications on your computer other than Zoom?
A. That's correct.
Q. Do you have any materials related to this IPR around you?
A. I have printed copies of our exhibits, Ferro patent, and my own declaration.
Q. Do you have notes on any of those copies?

A. Other than one or two -- sometimes I add the title to later pages so I don't have to waste time going back.
But other than that, there are some yellow highlights, but that is the extent of it. There's almost nothing.
And I understand these will be available to you afterwards, anyway.
Q. Okay. So you --
MR. SHAPIRO: Counsel, you agree to provide to us copies of the materials that Dr. MacCarley has with him that have been annotated in any way?
MR. STEIN: I don't think he said they are annotated, but I think he said there's highlights.
But if you make a formal request, we'll consider it.
(Exhibit 1009 was received and marked for identification on this date and is attached hereto.)
BY MR. SHAPIRO:
Q. Okay. Dr. MacCarley, I'm sharing with you a document marked Exhibit 1009. Hold on.
A. Be aware, I only have access to the Zoom

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window. If you have a separate program for displaying documents, I don't have it.
Q. Okay. So you haven't been set up for Exhibit Share and nobody -- are you alone in the room in which you're testifying?
A. Myself and Mr. Stein.
MR. SHAPIRO: Okay. Mr. Stein, do you have Exhibit Share set up?
MR. STEIN: I don't -- I don't have it open right now. I assumed when we get there in the deposition, we can open that. If we're there now, we can get that open.
MR. SHAPIRO: Right. So I just -- so what I did is I just shared Exhibit 1009.
THE TECHNICIAN: It's right in the chat. If you go in the chat and Exhibit Share, guest access link is right there.
THE WITNESS: Oh, there's a link to it?
THE TECHNICIAN: Yeah.
THE WITNESS: Okay. I will click on it, guest access Exhibit Share.
May I suggest you might find it easier to just do standard Zoom sharing in the main window.
MR. SHAPIRO: Okay. Well, we were set up

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with Exhibit Share so I could just drag -- I don't -- well --
THE WITNESS: No problem. I have it up.
MR. SHAPIRO: Yeah.
THE WITNESS: I see a -- I see a page from Veritext that simply has a single folder, EX1009.PDF.
BY MR. SHAPIRO:
Q. Is this document the declaration you submitted in this IPR?
A. Yes. 1009 is the declaration.
Q. Okay. In paragraph 34 of your declaration, you state that "claims are construed before the board using the same claim construction standard that applies in district courts."
Do you see that?
A. I'm going to that page now. Paragraph 34, "I understand the claim construction," etc. Okay. That's the third sentence.
"I further understand that the claims are construed before the board using the same claim construction standard that applies in district courts."
Okay.
Q. Can you -- can you please explain to me

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the "claim construction standard that applies in district courts"?
A. The distinction between the two -- it seems to be more of a legal question.
I -- being that this case is before the PTAB, I'm not prepared to provide that distinction.
I'd refer you to the attorneys on the case, who I would go to for that question, anyway.
Q. And what is the claim construction standard that you applied for purposes of your declaration?
A. Well, as stated in the declaration at the end of the section you cited, I say, [as read]:
"I do not believe that any express constructions are needed and have applied the plain and ordinary meaning of all terms to a person of ordinary skill in the art."
Q. All right. Dr. MacCarley, are you aware of any circumstances in which courts depart from the plain and ordinary meaning?
MR. STEIN: Objection. Form. Calls for a legal conclusion.
THE WITNESS: I would like to leave it with the comment of the objection of

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Mr. Stein.
BY MR. SHAPIRO:
Q. Again, as we discussed earlier, when -- when your counsel objects, you're still obligated to answer the question unless he instructs you not to answer the question.
So I'm going to answer it -- I'm going to ask the question again.
Dr. MacCarley, are you aware of any circumstances in which courts depart from the plain and ordinary meaning?
MR. STEIN: Same objection.
THE WITNESS: I believe a separate claim construction hearing is either written or sometimes argued in person -- is sometimes used to further clarify some of the terms in the document that may have been ambiguous or not sufficiently clear to either of the parties.
There is no such separate claim construction document in this case.
BY MR. SHAPIRO:
Q. Are you aware of any other circumstances in which courts may depart from the plain and ordinary meaning?

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MR. STEIN: Same objections. Calls for a legal conclusion.
THE WITNESS: I -- I'm not prepared to answer that.
To your question, I will say I am not aware. I'm not saying they don't exist. I'm just saying I'm not aware, to answer your question.
BY MR. SHAPIRO:
Q. Dr. MacCarley, in preparing your declaration, did you consider whether it would be appropriate to apply a construction other than the plain and ordinary meaning?
MR. STEIN: Objection. Form.
THE WITNESS: Did I consider it, is your question? I'll say, yes.
BY MR. SHAPIRO:
Q. And what was the basis for your consideration of whether it would be appropriate to apply a claim construction other than plain and ordinary meaning?
A. I found a few cases in which terms were a bit ambiguous, not --
Q. Was --
A. Go ahead.

Q. Were there any other considerations?
A. Well, in their ambiguity, they could be read multiple ways. That doesn't strictly mean a complete redefinition. It simply means they -- sometimes in the context in which they were used, certain terms could have been interpreted multiple ways.
Q. Any considerations other than ambiguity?
MR. STEIN: Objection. Form.
THE WITNESS: Well, as I just said, the fact that they could interpret it in multiple ways -- I'm trying to make a distinction between that and the more general notion of ambiguity.
Certainly, if you point me to a specific term, I could explain in greater detail.
BY MR. SHAPIRO:
Q. In paragraph 34 of your declaration, you also state that, [as read]:
"For the purposes of this declaration, I do not believe that any express constructions are needed and have applied the plain and ordinary meaning of all terms to a person of ordinary skill in the art."
You see that; correct?

A. Yes.
Q. Can you explain to me what you mean by "express constructions"?
MR. STEIN: Objection. Form.
BY MR. SHAPIRO:
Q. Okay. Let me re-ask that.
Can you please explain to me what you mean by "express constructions"?
MR. STEIN: Same objection.
THE WITNESS: We're getting deep into semantics here.
What I said is, "I do not believe that any express instructions are needed." That is, there was no need in a -- for instance, a separate claim construction hearing -- exchange of information, whatever you refer to it as -- as something that formally has to be redefined.
Also, ambiguity allows that it's -- it's outside of, say, reconstruction of the term. It's -- because it allows that in the document itself, things could be used in ways that are inconsistent. I found some of that.
That's what I mean by "ambiguity."
///

BY MR. SHAPIRO:
Q. Dr. MacCarley, did you construe any terms in preparing your declaration?
MR. STEIN: Objection. Asked and answered.
THE WITNESS: Gosh, you mean in terms of the way I thought about it or I interpreted it, as opposed to, say, the way another expert might interpret it?
Could you clarify, please?
BY MR. SHAPIRO:
Q. My question is whether you construed any claim terms during preparation of your declaration.
MR. STEIN: Same objection. Asked and answered.
THE WITNESS: Well, as in the declaration, I say that "I do not believe any express constructions are needed and have applied the plain and ordinary meaning of all terms to a person of ordinary skill in the art."
So allowing for the ambiguity, either natural or artificial, that appears in the patent, I didn't feel to expressly apply my

own personal construction, if I understand your question.

I did my very best to stay with what I stated in paragraph 34.

BY MR. SHAPIRO:

Q. Dr. MacCarley, what is the plain and ordinary of the term, "energy transaction execution engine," that you applied for purposes of your declaration?

MR. STEIN: Objection to form. Foundation.

THE WITNESS: Well, that is a unique phrase. First time I think I've seen it in a printed document.

But it became immediately clear, both from the claim terms and the context as it's used in the text of the patent, that they are referring to, basically, something that controls the charging transfer of electric current to the vehicle based upon decisions that it is capable of making as a computational device.

BY MR. SHAPIRO:

Q. Dr. MacCarley, what's the plain and ordinary meaning of the term, "a set of operation

parameters of the charging operation," that you applied for purposes of your declaration?

MR. STEIN: Objection. Foundation. Form.

THE WITNESS: Again, what I heard you ask about is "operational parameters." You gave -- you offered -- you asked about two different perspectives.

Perhaps you could repeat the second half of your question.

BY MR. SHAPIRO:

Q. Well, as -- as we discussed before, in paragraph 34 of your declaration, you stated that, [as read]:

"For the purpose of this declaration, I do not believe any express constructions are needed and have applied the plain and ordinary meaning of all terms to a person of ordinary skill in the art,."

Is that correct?

A. That's correct.

Q. And so I'm asking, what is the plain and ordinary meaning that you applied for purposes of your declaration as stated in paragraph 34? Do you understand?

A. And you're referring to "operational parameters," that term?

Q. And the term I'm referring to in this question is the plain and ordinary meaning of the term, "a set of operation parameters of the charging operation" -- I'm sorry -- "operational parameters."

So what is the plain and ordinary meaning of the term, "a set of operational parameters of the charging operation"?

MR. STEIN: I'll just interject there with the same objection, please. Form. Foundation.

THE WITNESS: Well, these are stated in the patent, both in the claims and the text. And I stuck with what the patent said.

I could answer that question at a more general level outside the context of the patent.

But I'm going to presume that you want the specifics as to this patent.

So I'm going to go to the claims, which --

BY MR. SHAPIRO:

Q. Would it be helpful to you if we -- if we

brought up the claims?

A. I have a written copy in front of me. No need.

MR. STEIN: If we can let the witness finish his answer, I don't think he finished it.

BY MR. SHAPIRO:

Q. Would you like to finish the answer, or would you like to back up and do this in the context of the claims?

A. Oh, well, I was about to do it in the context of the claims. I --

Q. Okay.

A. I prefer I do it in -- I give you a more general -- call it a more "academic" definition. I can do that also.

Q. Okay. Hold on --

A. But --

Q. Give me a moment.

So nobody has Exhibit Share -- correct -- except for me at this point?

A. I have -- I am looking at your Veritext Exhibit Share screen, but I do not see a document open.

(Reporter clarifying.)

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MR. SHAPIRO: I'm dragging exhibits into the marked exhibits folder.
And you should be able to see that.
(Reporter clarifying.)
(Exhibit 1001 was received and marked for identification on this date and is attached hereto.)
BY MR. SHAPIRO:
Q. Dr. MacCarley, can you refresh your Exhibit Share screen?
A. I have done so, and I now see exhibits 1001 and 1009.
Q. Okay. I've shared with you Exhibit 1001.
Can you confirm that this exhibit is U.S. Patent No. 8,103,391, Dr. MacCarley?
A. Yes. Well, I haven't opened the document, so I can't tell you what's inside.
But Exhibit 1001 is the '391 Ferro patent.
Q. Dr. MacCarley, can you open the document and confirm that it is U.S. Patent 8,103,391, please?
A. Opening it now. Still waiting -- it is now open.
I'm looking at the front page of it. And

comparing it with the written copy that I have, they appear to be identical. So I will say, yes, I do confirm.
Q. Thank you.
Can you turn to Claim 1 at the end of the '391 patent?
A. I'm there. I'm looking at my printed copy, which I simply find easier to navigate.
Q. And previously, I asked you for the plain and ordinary meaning of the term, an "energy transaction execution engine."
Do you remember that?
A. Yes.
Q. Do you see that term, an "energy transaction execution engine," in Claim 1 of the '391 patent?
MR. STEIN: Objection. Form. Foundation.
THE WITNESS: In the third limitation, it is mentioned for the first time.
Would you like me to repeat that -- quote that?
BY MR. SHAPIRO:
Q. Do you see in Claim 1 of the '391 patent, a limitation, "responsive to receiving, from an

energy transaction execution engine"?
A. What I see is "in response to the energy transaction execution engine to terminate the charging process," which is the very last line of the --
Q. Okay. Dr. MacCarley, can you go to the first limitation of Claim 1?
A. "Response to receiving" -- oh, I see what you're referring to now. "From" -- the difference only with that word. Yes.
Q. So does -- does Claim 1 recite "an energy transaction execution engine"?
A. Yes, it does.
Q. And, Dr. MacCarley, the plain and ordinary meaning that you provided for an "energy transaction execution engine" earlier in this deposition, was that for the term that appears in Claim 1 of the '391 patent?
MR. STEIN: Objection to form. Mischaracterizing.
THE WITNESS: I'm going to -- I'm going to start from the very beginning of the claim.
[As read], "A computer implemented method of managing a charging process of an electric

vehicle, the computer implemented method comprising: responsive to receiving, from an energy transaction execution engine, a request signaling a start of the charging process" -- and this is, I might point out, a potential area of syntactic ambiguity.
And then there's a comma, "monitoring a set of operational parameters of the charging process during the flow of electricity for one or more interruptions."
What he's saying is --
(Reporter clarifying.)
THE WITNESS: Oh, I'm so sorry.
Is there anything I can do at my end to increase the microphone sensitivity?
(Reporter clarifying.)
THE WITNESS: I got a little sidetracked there.
It is consistent with my answer to your previous question about my interpretation of what an energy transaction execution engine is.
BY MR. SHAPIRO:
Q. Thank you.
And in that same limitation in Claim 1 of

the '391 patent, do you see the term, "a set of operational parameters of the charging process"?
A. I do.
Q. Can you tell me the plain and ordinary meaning of the term, "a set of operational parameters of the charging process"?
MR. STEIN: Objection to form and foundation.
THE WITNESS: Okay. Yeah. This was your prior question before we got sidetracked.
There are -- in various claims distributed as well as in the texts, there are specific operational parameters that it is considering when it is -- when the energy transaction execution engine is terminating the charging process.
And the monitoring of those parameters is in the hands of the -- the interrupt monitor has other words associated with it, but that's the core of it.
And I -- I will go through here and enumerate every one of the operational parameters they are specifically referring to if -- if that would be the succinct answer to your question.

BY MR. SHAPIRO:
Q. You can continue.
A. Okay. Let's see. The operational parameters are -- I'm going to speak generically and then drop into specific quotes.
The operational parameters are things that are being monitored by the -- well, they refer to it as the "interrupt monitor."
But they are the things that are responsible for causing or requesting that the energy transaction execution engine terminate charging.
And among these are -- there is -- moving to Claim 2, there is a manual override interruption, that the state of the manual override switch would be considered an operational parameter.
There is a device capabilities interruption, which means that if something internal in one of the presumed electronic or even mechanical devices had failed, that that would be an operational parameter that is being monitored.
There is a data services interruption, which would be monitoring the operational parameter -- the operational state of data

communication either between the two units, the execution engine and the interrupt monitor, or external infrastructure events. They allow in the text.
There is -- refer to a "device capabilities interruption." So in this case, the operational parameter would be some capability of a device that may be in a fault state.
There is a preference interruption, which is somewhat broadly defined as an externally settable parameter either by the user or by some external parameter setting input that has been violated or is altered or for whatever other reason needs to be monitored and could potentially indicate that termination of charging is appropriate.
There is -- I've already mentioned the data services interruption.
There is override -- I think that covers the items that you specifically mention in the claims.
But to more completely answer your question, I mean, operational parameters that could actually fall within -- theoretically, any fault state could potentially be considered an

"operational parameter." I do talk about that in a lot of different places in the declaration.
And as when you're -- when you later asked more specific questions about it, I make sure that I identify something that -- within the scope of the "operational parameter" definition.
Q. Thank you, Dr. MacCarley.
And in that same limitation and that same term, what does the term, "a set" -- I'm sorry. Let me re-ask that question.
In the same limitation of Claim 1 of the '391 patent, what does the term -- what is the plain and ordinary meaning of the term, "a set"?
MR. STEIN: Objection. Form. Foundation.
THE WITNESS: It would be the group, a designated group, something that in the context surrounding that statement would make the significance of clear.
BY MR. SHAPIRO:
Q. Dr. MacCarley, what is -- well -- Dr. MacCarley, in the second limitation in Claim 1 of the '391 patent, do you see the term, "the set of operational parameters which conform to a set of predefined interrupt conditions"?

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A. Yes.
Q. Can you tell me the plain and ordinary meaning of the term, "the set of operational parameters which conform to a set of predefined interrupt conditions," that you applied in your declaration?
MR. STEIN: Objection. Form.
THE WITNESS: I applied the definition exactly as stated in that limitation, which -- "the set of operational parameters which conform to a set of predefined interrupt conditions," which I'll take and say what they mean here is that should cause what they define elsewhere as an interruption in a charge applied to the battery.
And then they list the three that I mention after comprehensively going through all the claims, which is one of -- at least one of a device capabilities interruption, a preference interruption, and a data services interruption.
BY MR. SHAPIRO:
Q. And what's the plain and ordinary meaning of "which conform to a set of predefined interrupt conditions"?

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MR. STEIN: Objection. Asked and answered.
THE WITNESS: The plain and ordinary meaning would be comparing a value measured from the environment, one of the operational parameters, that would either exceed a threshold or logically trigger a binary type of event.
Like, a failure of data communication would -- that's not a threshold type of thing. It just simply disappeared; therefore, that would be a condition that should lead to the interruption of charging of the battery.
Now, I hope I've understood your question correctly.
BY MR. SHAPIRO:
Q. Okay. And, Dr. MacCarley, do you see in the second limitation of Claim 1 of the '391 patent the term "device capabilities interruption"?
A. Yes.
Q. What is the plain and ordinary meaning of "device capabilities interruption"?
MR. STEIN: Objection. Form.

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THE WITNESS: The plain and ordinary meaning of "the device capabilities interruption," which is consistent with its use, both the claims and the text of the patent -- I'm going to answer out of context first because you phrased the question, "plain and ordinary meaning" -- means that if a certain device capability is compromised in some way, disrupted, out of calibration, or in some other way detected as being in a failed state, that would -- that would be a very good example of -- those would be very good examples of device capability interruption.
A device is no longer capable of doing something that it should, if I had to put it in the plainest language I could.
BY MR. SHAPIRO:
Q. Is that the plain and ordinary meaning of the term, "device capabilities," that you applied in your declaration?
MR. STEIN: Objection to form.
THE WITNESS: I'm hesitating only because -- I will say, yes.
But I have to allow that in a 131-page

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declaration and in talking about plain and ordinary meaning, there could be variations of that.
But, yes, that is how I interpreted it.
BY MR. SHAPIRO:
Q. And in the second limitation of Claim 1 of the '391 patent, do you see the term, "a preference interruption"?
MR. STEIN: Objection. Form. Foundation.
THE WITNESS: I do.
BY MR. SHAPIRO:
Q. What is the plain and ordinary meaning of the term, "a preference interruption," that you applied in your declaration?
MR. STEIN: Objection. Form.
THE WITNESS: Again, allowing for the possibility of slight variations -- to answer your question, preference interruption would be a violation of either some threshold or some state, both of those being compared with an operational parameter input that, if that difference occurs -- if, say, a threshold is exceeded or a state is violated, put into something other than what was preferred when

the preference was set up, that would constitute an event worthy of generating an interruption of charging.

BY MR. SHAPIRO:

Q. Dr. MacCarley, in the second limitation of Claim 1 of the '391 patent, do you see the term, "a data services interruption"?

A. Yes.

Q. What is the plain and ordinary meaning of "a data services interruption," that you applied in your declaration?

MR. STEIN: Objection. Form.

THE WITNESS: This does come up in my declaration.

But the way you've asked the question, what is the plain and ordinary meaning that I have chosen to apply, I would say it's certainly consistent with however I stated it in the declaration in places.

And I'll step back then and more directly answer your question by saying, the plain and ordinary interpretation of that would be some disruption of normal data communication from one entity to another or to multiple other targets.

That would be of concern and, therefore, would justify the interruption of electric power being provided to charge the battery.

MR. SHAPIRO: Okay. We've been going almost an hour.

Should we take a five-minute break before we resume?

Is that okay, Counsel?

MR. STEIN: Yeah. It's up to what you and the witness would like to do.

THE WITNESS: It's fine with me.

MR. SHAPIRO: Okay. Let's do that.

Thank you.

THE WITNESS: Thank you.

(Short break taken.)

BY MR. SHAPIRO:

Q. Okay. Dr. MacCarley, do you see in the first limitation of Claim 1 of the '391 patent the term, "during the flow of electricity"?

MR. STEIN: Objection. Form.

THE WITNESS: Yes.

BY MR. SHAPIRO:

Q. What is the plain and ordinary meaning of the term, "during the flow of electricity," that you applied in your declaration?

MR. STEIN: Objection. Form.

THE WITNESS: Indicates that electric power was flowing into the battery. In other words, in a -- in a narrower definition of the word "charging" than I think it's being used in this patent. The battery is being charged.

BY MR. SHAPIRO:

Q. Okay. Thank you.

Dr. MacCarley, in your opinion, does the term, "energy transaction execution engine," have the same meaning in Claims 1, 8, 15, and 20 of the '391 patent?

MR. STEIN: Object to form.

THE WITNESS: You said 1, 8, 15, 19, and 20?

BY MR. SHAPIRO:

Q. 1, 8, 15, and 20.

A. 20. That's a comprehensive type of question. I would like --

Q. Let me make it easier. Let me make it easier for you.

Dr. MacCarley, do you understand that the '391 patent has four independent claims: 1, 8, 15, and 20?

A. As you've just pointed it to my attention, yes, those appear to be the independent claims.

Q. And is it your opinion, Dr. MacCarley, that the term, "energy transaction execution engine," has the same meaning in all of the independent claims of the '391 patent?

MR. STEIN: Objection. Form.

THE WITNESS: Again, I'm going to read these to make absolutely sure I have accurately and comprehensively answered your question.

As referred to in the third limitation of Claim 1, "to terminate the charging process" -- (sotto voce).

They appear to be consistent.

BY MR. SHAPIRO:

Q. In your opinion, Dr. MacCarley, is the plain and ordinary meaning of the term, "a set of operational parameters of the charging operation," the same in all of the independent claims of the '391 patent?

MR. STEIN: Objection. Form.

THE WITNESS: To answer that question, I'm going to have to review all of the

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claims, since I sense that you're looking for subtle differences.

Please give me a moment.

BY MR. SHAPIRO:

Q. Take your time.

A. I want to listen to your question a bit more carefully.

Could you please repeat it?

MR. SHAPIRO: Ms. Harris, could you read my question back to the witness?

(Reporter clarifying.)

(Record read.)

BY MR. SHAPIRO:

Q. Dr. MacCarley, is the meaning of the term, "a set of operational parameters of the charging operation," the same in all the independent claims of the '391 patent?

MR. STEIN: Objection. Form.

THE WITNESS: I'm reading through them now, as to explain the delay.

Okay. I put these on only because it's kind of noisy in here.

The term, "set of operational parameters," is used quite broadly, and it is not mentioned in all of the claims.

But in those in which it is mentioned, it is -- I think they are all encapsulated within the -- their interpretation, their definition of "a set of operational parameters," clarifying those things that are monitored from the external environment.

BY MR. SHAPIRO:

Q. Okay. Thank you.

And, Dr. MacCarley, in your opinion, is the meaning of the term, "the set of operational parameters, which conform to a set of predefined interrupt conditions," the same in all the independent claims of the '391 patent?

MR. STEIN: Objection.

THE WITNESS: I pause because you're citing a particular interpretation that they used and then asking whether it is consistent across all of the claims.

They -- there are a range of operational parameters mentioned. The term is used very broadly.

So I guess the succinct answer to the question you asked is, no, there are -- there is a wide range of things that could be considered as "operational parameters."

And when they are addressed in Claim 1 and elsewhere, they are basically put into three fairly wide categories.

You asked about the one associated with exceeding the threshold. There are other operational parameters that do not involve exceeding a threshold.

I'll --

BY MR. SHAPIRO:

Q. Dr. MacCarley -- go ahead. Sorry.

Complete your answer.

A. I hope that has -- perhaps it's more detail than you needed, but I'm trying to be very specific.

Q. Do you agree, Dr. MacCarley, that certain terms appear in all of the independent claims of the '391 patent?

MR. STEIN: Objection. Form.

THE WITNESS: Am I aware that certain terms appear in all of the independent claims? Gosh, I suppose so. Looking at them -- scanning them now, there are certainly a lot of words that are common to them.

I -- maybe you could be just a bit more

specific as to what you're trying to identify or -- yes, there are -- there are common terms.

As a comprehensive type of question for me to enumerate a list, if that's what you were hoping for, that's going to take some time.

BY MR. SHAPIRO:

Q. Dr. MacCarley, for terms that are common to all of the independent claims of the '391 patent, did you give those terms the same construction in each of the dependent -- independent claims?

MR. STEIN: Objection. Form.

THE WITNESS: Well, since I just made clear that I -- I'm not prepared to fully identify everything that is common between them -- but my overview opinion of the claims is they've been -- they've been reasonably consistent.

Again -- I'm sorry. That's a -- that's not really a technical question.

I believe that those terms, not it -- completely identified that are shared between the two have -- based on a cursory glance at

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this, they appear to be used consistently.
But I am aware of cases where, in context, they could be read, maybe, slightly differently.
That's the best answer I could give you.
BY MR. SHAPIRO:
Q. Dr. MacCarley, did you apply a different plain and ordinary meaning for any of the terms that we discussed earlier in your deposition in Independent Claims 8, 15, and 20?
A. Well, any other claims discussed, did I apply a different interpretation?
I'm going to have to ask -- answer that question generically.
I have strived to be consistent in my interpretations. I have -- am willing to follow the interpretations, the meanings, as used in Ferro.
I have not applied any license beyond that to interpret something that would be inconsistent with what I believe a POSA would read in the patent claims.
Q. Dr. MacCarley, in Claim 2 of the '391 patent, do you see the term, "manual override interruption"?

A. I do.
Q. What is the plain and ordinary meaning of the term, "manual override interrupt," that you apply in your declaration?
MR. STEIN: Objection. Asked and answered.
THE WITNESS: You phrased the question, "What is the plain and ordinary meaning"?
Allowing for the possibility that there are subtleties, especially in the text of the patent, the plain and ordinary meaning of a "manual interrupt" would be -- usually be a human being or some external, decision-making entity providing an input to the system that would lead to the interruption, the termination, of the charging process.
BY MR. SHAPIRO:
Q. And does the term, "manual override interruption," have the same meaning in Claims 9 and 16 of the '391 patent?
MR. STEIN: Objection. Form.
THE WITNESS: I'm reading those now.
(Sotto voce).
They appear to be consistent. They -- they speak to different aspects of it, but I

don't see any distinction in Ferro's interpretation.
BY MR. SHAPIRO:
Q. In Claim 4 of the '391 patent, do you see the term, "electric vehicle transaction infrastructure"?
A. I do, the last words of it.
Q. Do you see the same term, "electric vehicle transaction infrastructure," in Claim 11 of the '391 patent?
A. I do.
Q. I'm sorry, Dr. MacCarley.
Did you answer the question?
A. Yes. I said, I do see it.
Q. Okay.
A. Was there a -- did I miss a question?
Q. No. I didn't hear you. Thank you.
And do you see the term, "electric vehicle transaction infrastructure," in Claim 18 of the '391 patent?
A. I do. Again, last words.
Q. What is the plain and ordinary meaning of the term, "electric vehicle transaction infrastructure," that you applied in your declaration?

MR. STEIN: Objection. Form.
THE WITNESS: This is discussed in the declaration. It may take me a while to find it.
May I request of you -- we could save time if you -- you have word search capability in front of you. I do not. I have my eye scan availability only.
If you could identify areas in my declaration where "infrastructure" is mentioned, I could -- I could address each one in a series.
BY MR. SHAPIRO:
Q. I'm not asking about a specific use of the term in your declaration.
I'm just asking for the plain and ordinary meaning of the term that you applied.
A. Well, that is what is stated in the declaration, and I refer that -- and I first refer you to what I already said and then elaborate as necessary.
Q. Well, take your time.
Find -- find where you addressed it, and then answer my question.
A. Sure.

(Sotto voce).
Just because it's noisy in here.
I'm not making an exceedingly fast word search progress through my own declaration.
But I think a bit -- I think I have a better way to answer your question, since it's a comprehensive one.
In the Ferro patent, Figure 3, is a black diagram of an energy transaction infrastructure in accordance with an illustrative embodiment.
And it says, "Electric vehicle energy transaction infrastructure is a charging infrastructure for managing all phases of an electric vehicle charging transaction" -- by the way, I'm in Column 7, starting at line 30 of the Ferro patent -- "managing all phases of an electric vehicle charging transaction."
The components elaborate as to what's in the infrastructure. So interpreting what they say here, first of all, I want to assure you, aware of this, I was faithful to their definition of an "infrastructure," which, within the plain and ordinary meaning, could mean a lot of different things.
But summarizing their interpretation, it

is "all phases of an electric vehicle charging" -- for managing -- it's for "managing all phases of an electric vehicle charging transaction." And that would admit both components and functions within their charging system as well as external inputs that meet the definition of "managing all phases of an electric vehicle charging transaction."
I'll -- I'm confident that I was consistent with that interpretation throughout this document. That being said, without comprehensively looking for every possible mention of the word "infrastructure."
That's my answer.
Q. Is the meaning of the term, "electric vehicle transaction infrastructure," that you just gave me the plain and ordinary meaning of the term?
MR. STEIN: Objection. Form.
THE WITNESS: Oh, boy. That is a pretty rare assemblage of words. So when you ask, "the plain and ordinary meaning," it's -- it's going to be context dependent.
I could -- I could say with confidence that, in this context, there's nothing --

nothing that would put it outside the realm of possible plain and ordinary interpretations.
Again, in context, it could be interpreted a lot of different ways.
BY MR. SHAPIRO:
Q. So the term, "electric vehicle transaction infrastructure," could have a different meaning in the context of the '391 patent?
MR. STEIN: Objection. Mischaracterizing.
THE WITNESS: Yeah. I -- yeah. I don't -- that's -- that's inconsistent with what I said.
I'm repeating Ferro's definition: the "charging infrastructure for managing all phases of an electric vehicle charging transaction."
And I will opine further that, generally, wording like that is allowing a lot of leeway in the -- in the possible interpretation for intellectual property purposes.
But -- and that's -- that contention is further supported by the fact that I -- going

through the claims again -- give me -- can you direct me to any mention in the claims of "infrastructure"? Is it --
BY MR. SHAPIRO:
Q. Well, does the term, "electric vehicle transaction infrastructure" have the same meaning in Claims 4, 11, and 18?
A. Okay. There it is, 4.
(Sotto voce).
They are consistent in that, again, they are defining it pretty broadly. 4 speaks -- refers to a "component of an electric vehicle transaction infrastructure." So does 11 -- has "device capabilities."
It does appear to be consistent. Their use of that term in the claims, the three claims that you mentioned.
Q. Okay. Thank you.
Dr. MacCarley, do you see the term, "a participant to the charging process," in Claims 5 and 12 of the '391 patent?
A. 5 and 12, I do see both of those.
Q. What is the plain and ordinary meaning of the term, "a participant to the charging process," that you applied for your declaration?

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MR. STEIN: Objection. Form.
THE WITNESS: The way I stated it in the previous answers to your question is it could be, say, a human being that is activating a manual override.
It could be, not just activating it, but also setting those preferences, possibly, say, thresholds, that are tested to see if they are exceeded.
Or it could be an external, decision-making entity that has set those parameters, based upon whatever, a change event, that's brought us electric rates or something from the environment.
So "participant" means -- succinctly stated, it's the thing that selects the preference, at the risk of repeating the question back to you.
BY MR. SHAPIRO:
Q. Dr. MacCarley, in the term, "manual override interruption," in Claims 2, 9, and 16, how did you construe the term, "manual"?
MR. STEIN: Objection. Form.
THE WITNESS: Well, I was visualizing this in the declaration.

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I don't recall feeling compelled to add any further detail to a term as plain as "manual."
Again, it's the action of that participant that -- it's one of the actions of the participant that -- other than, say, setting parameters, it's a human being or some external decision-making entity that would activate a -- in this case, "manual" is used almost exclusively in the context of a manual shut off-switch, which is usually used in the event of either the desire to terminate the charging process early for an emergency, say, for instance, the owner of a vehicle could see something going wrong with the charging process.
MR. STEIN: Do you have any question, Jason, or are we just waiting for the next one?
MR. SHAPIRO: We're waiting for the next question.
BY MR. SHAPIRO:
Q. Dr. MacCarley, let's go back to your declaration, Exhibit 1009. And if you could turn to paragraph 42 of your declaration, and then I'll

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ask the question.
A. Okay.
Q. So in paragraph 42 of your declaration, you opined that Kimura alone renders obvious Claims 1, 4 through 8, 11 through 15, and 18 through 20 of the '391 patent.
Do you see that?
A. Yes.
Q. Can you please identify for me the elements of independent Claims 1, 8, 15, and 20 that are not disclosed in Kimura but would have been obvious, in your opinion?
MR. STEIN: Objection. Form. Foundation.
THE WITNESS: They do not specifically disclose -- disclose in Kimura what would have been obvious to a POSA.
Do I understand your question correctly?
BY MR. SHAPIRO:
Q. Yes.
A. Well, this -- this -- the answer to that type of question is -- I mean, the very thing that rather extensive text is devoted to in the declaration. In section -- Section 11a, you asked about -- I'll start with 4. Excuse me.

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You didn't -- you started with 1; is that correct? You said -- 1, 8, 15, and 20 is my recollection --
Q. Correct. Correct.
A. So let me go to --
Q. Well, let's make it simpler. Let's do Claim 1 first.
Can you identify --
A. I think --
Q. Can you identify for me the elements of Independent Claim 1 that are not disclosed in Kimura but would have been obvious in your opinion?
MR. STEIN: I think he shouldn't be interrupted. I believe he was answering your question. So he should be allowed to finish before you ask him the question.
THE WITNESS: I appreciate that. That's a helpful suggestion.
And I'm looking at that right now. I was trying to form an answer.
And Claim 1 is rendered through -- (sotto voce).
Subject to the POSA's interpretation as mentioned in paragraph 49, at first glance, a

reading of the patent would -- would -- a "charging process" is referred to, might require the clarity added by the intelligence of a POSA to realize in context that the process is more than just the transfer of electricity.

I believe I'm answering the intent of your question here.

What was not so specifically mentioned in Kimura but relied on with the interpretation of a POSA; is that correct? That's --

BY MR. SHAPIRO:

Q. Right.

The question -- the question is, could you please identify for me the elements of Independent Claim 1 that are not disclosed in Kimura but would have been obvious in your opinion?

A. Yes. Well, being that I'm -- in context, "charging process," what -- what they meant by it would have been obvious, as I describe in paragraph 49, that it's more than just the transfer of electricity. That's one element, exchange of information.

Kimura uses the word "microcomputer of

the charge controller." I don't believe that is mentioned in '391. But in context, it's clear that that's what was intended, '391 -- in Claim 1 of '391.

We talk about a computer implemented method of managing a charging process in an electric vehicle, "the computer implemented method compromising."

So I would have interpreted that as obvious. I'm sure any POSA would also. And I make that clear in paragraph 53 of the declaration.

Let's see. Charge controllers -- transmits -- Kimura uses the term, for the medium by which the -- the initiation of charging, that is -- mentions transmitting of charge start signal via the control line. I believe the wording was slightly different in '391.

But, again, that's on obvious thing. A control line can -- to someone with any knowledge in the field, they would -- they would know -- it would be obvious what they are talking about: Some electronic or similar path by which the data can be communicated, the signal can be communicated, the request to start could be

communicated in this specific case.

As I mention in 56, I'm confirming my opinion that the presence of a request signal -- signaling the start of the charging process in Kimura would be considered obvious, an obvious element for, among other reasons, the fact that it had been mentioned 14 years prior in a standard for conductive charging that anyone working in the field, I believe, would be at least aware of. That's J1772.

Continuing -- aware this is somewhat redundant. Kimura refers to their equivalent of an energy transaction execution engine as the "controller." And again, that connection in context would be obvious -- obvious to me, and I believe obvious to a POSA.

And I -- I mention that specifically in the latter part of paragraph 57. And I say, "Embodiments of the energy transaction execution engine in the '391 patent are likewise broad." So it certainly admits that interpretation. This is -- this would be obvious.

That's further amplified in my paragraph 58, where I say that, "the charge controller 24 of the energy transaction execution engine from the

'391 patent perform similar functions, including," and I go through all the things that it does, which are the same.

I connect the dots as obvious Kimura's use of the word "battery controller" and its function that is, if not the same or shared with that of the interrupt monitor of '391 -- when I say that -- my understanding of Kimura, the battery controller 14 then monitors operational parameters responsive to receiving the signal.

This is after it has been told to start via the charge start signal that originated from the execution engine.

That's obvious to me; I believe would be obvious to a POSA.

Looking further at the mention of "operational parameters" -- let me read -- you asked repeatedly about -- in Limitation 2 of it.

Kimura provides a more detailed, more extensive set of operational parameters that should be monitored. And I believe that they were allowed within the three categories stated in the '391 patent of interruptions, including power leakage, battery charging losses, state of charge of the battery, voltage of the battery, quantity

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of the battery, stored energy in the battery, and communication time delay, etc.

So to someone working in the field, including myself, that would be a point that I found obvious that would not be stated in exactly the same words in Kimura that they are stated in '391 in. Monitoring voltage, for instance, provide more detail about that in 6 -- Part 61, 62.

Kimura provides -- Kimura, which is Exhibit 1002, it's Figure 6 that I duplicate on page 30 of the declaration. It's sort of a high-level block diagram illustrating the very function that is discussed in the data communication between the energy execution engine, which would map to Item 24, the charge -- the charger controller and on the right, Element 14 of Kimura, battery controller.

In this context for this function, it's doing the same thing as the interrupt monitor -- excuse me -- interruption monitor of '391. It's talking specifically in this case about two of the possible things that it might want to communicate.

Again, in this case, Kimura is more specific than the Ferro patent. In my mind, it

can't be held against it for expressing greater detail and knowledge and context.

In paragraph 63, I map Kimura's statement that the, [as read]: "controller 14 determines whether the charge operation is ended on the basis of the voltage and remaining quantity of the current."

It's, again, referring to the figure, I believe, that I just mentioned. And it's, again, just more specific than the way it is stated in '391.

So I considered it an obvious interpretation. And Kimura indicates that electricity is flowing, in paragraph 64, as early as the first monitoring step.

And then essentially charging is mon- -- all of the parameters are being monitored while the vehicle is receiving current, more generically, being charged.

And their wording would be different than it is stated in multiple places in Ferro, but it is obvious they are -- when they talk about turning off the current for certain parameters -- in this case, battery current or stated charge would initiate that -- would be interpreted as

what Ferro refers to as "interruptions."

I'm connecting the dots there. I find those to be obvious interpretations.

The same, jumping down to paragraph 66, can be said for vehicle side interruptions caused by power leakage in the electric vehicle, failure of battery, break in the charge circuit, communication failure. All of those are as much and more as stated specifically in Ferro. And therefore, the connection between the two would be obvious, in my opinion.

See the energy transaction request -- in 67 I talk about -- I allow that some -- some obviousness connection is necessary when you're interpreting what Kimura states as "responsive to receiving, from an energy transaction execution engine" -- duh, duh, duh -- a request signal.

Now I'm quoting from Kimura. That maps to the initiation signal first sent by the energy transaction execution engine in Ferro to the interrupt monitor, telling it, time to start watching for interrupt conditions. That is conditions that should be detected as the reason that an interruption of power should occur.

There's multiple ones stated there. I'll

spare the -- there I'm referring to paragraph 67 of my declaration.

In 68, I appeal, again, to the SAE standard, which I believe is fairly common knowledge of someone working in the field. It would actually be required -- required knowledge of anybody working in the field, since anything they produce has to be standard compliant. Would have been necessary in the design of the charging system.

"Condition shall be monitored" -- to be more specific, again, about an area that required my obviousness interpretation, I am saying that a POSA with knowledge of this and other SA IEEE, NEA standards -- excuse me -- NEC, which are electric code standards, would be aware that when the standard states, "Conditions shall be monitored continuously during the charge process" -- this is a quote from the standard.

But it's obvious they are talking about the same thing that's going on in '391.

So what I'm saying is that a POSA aware of this would know that the obvious -- that they could interpret -- I could interpret what is going on in '391 as being virtually the same as what I

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stated above, read specifically quoted the from Kimura, all of the monitoring functions.

Continuing -- I'm still on claim one, still on Limitation 1 of Claim 1, to be specific.

70, I make it clear that it's obvious when you talk about, say, additional abnormalities, which were clearly intended within the realm of, say, a capabilities interruption, as stated in '391, that -- including overheat or a power failure or a component -- say, a power supply failure in the high voltage power supply, that those are obviously what is being referred to in Claim 1 of -- and elsewhere in the '391 patent.

71, I made clear these are detection of charger-side abnormalities. And it's obvious -- Kimura says that those will lead to a charging process termination that is -- what is referred to in '391 as an interruption due to some sort of disruption or, in Kimura's words, "abnormality."

Kimura goes on through the end of 74, talking in more specific terms about all those things that would constitute capabilities, interruptions, or arguably preference interruptions or data communication interruptions.

72 is -- specifically does talk about a

component -- component failures in, say, for instance, high-voltage power supply.

These are all just more detailed descriptions of the rather generic mentions of these type of external events in '391.

And finally in 74 -- I'll just read it: "As noted above with respect to the vehicle-side monitoring, published standards that pre-date '391."

I'm actually -- in the interest of obviousness -- yes, obviously I'm referring to the cited standard.

There are many -- there's at least six, seven other SAE standards alone that speak to monitoring and data communication as required in any DC charging, which high-voltage supply is apart from the vehicle, which is in -- the entire context of the '391 patent, by the way, is equally true for charger-side monitoring.

Moving to Limitation b of 1, if you'd like me to continue. Please advise.

That was a question for you.

Q. Are there other limitations in Claim 1 of the '391 patent that are not shown in Kimura that are obvious?

MR. STEIN: Objection. Asked and answered.

He's in the middle of answering that question.

THE WITNESS: Well, yes, when I said, Do you want me to continue and keep going through every one that I can think of or can find in my declaration, I can keep doing that. So --

BY MR. SHAPIRO:

Q. Can -- is it possible to just give me a list without explaining why?

MR. STEIN: Objection. Form.

THE WITNESS: I'm not prepared to consolidate many, many pages of my declaration into a list form.

But I think that the key ones I already have enumerated. For instance, the much greater detail that Kimura devoted to describing interruption conditions, how it's obvious they are talking about the three interruption categories specifically mentioned the '391 patent.

I will continue, though, unless you tell me otherwise.

I state an opinion in 75, Kimura explains that, [as read]: "interruption detection involves determining whether the monitored operational parameter" -- duh, duh, duh -- "conforms to predefined interrupt conditions."

Now, those -- in fact, almost the same words that appear in '391. I'm not sure how much obviousness interpretation that requires.

But consider it my opinion that that's an obvious connection.

How a controller detects communication abnormalities -- this -- just to make clear, it is obvious that the "communication abnormalities" referred to here would be -- fall within the category of '391's data -- they don't use the word "communication" -- data -- their data interruptions. Have to find the specific word.

Define interrupt conditions -- (sotto voce) -- data services interruptions.

Continuing, Kimura goes so far as to cite something that actually required great insight that was missed, I believe, in '391

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but was within their general interpretation when they talk about device capabilities or, arguably, device preferences.

They cite the detection of leakage power in the electric vehicle or battery failure for a charge circuit breakage. That would be -- the latter would be pretty clear, a device capabilities interruption type of event.

What I was more impressed with, as I mentioned before, was that they were aware of the need to detect leakage power, which would suggest that there is either a short circuit somewhere in the wiring of the vehicle or the charger leading up to it.

But that -- pushing current into it, in which all of the current could not be accounted for as it enters the battery compared to when it originates from the high-voltage power supply. That's generally how that's detected. That's a safety condition, and it's an important one.

Then "detect these abnormalities," we understand Kimura -- again, Kimura says it as "exchange between the battery controller and

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the charger controller." Mapping that back to '391, that's the interrupt monitor and the energy transaction engine.

I -- in this section in which you can -- you can clearly see I devoted a lot of attention. I want to clarify, some of these things are, let's just say, so obvious they didn't need to be mentioned as points of obviousness.

And I'm -- so understand that when I go through all of this, we're talking about various degrees of obviousness. It doesn't necessarily -- in other words, I'm not saying they are missing from Kimura.

I'm saying they could be interpreted as missing in the most critical analysis. So I'm making sure that they are covered, just trying could be comprehensive.

Detecting more about abnormalities in the apparatus, the equipment. For "detecting the one or more interruptions" -- it's wording from '391. I'm now in paragraph 82. And I contend that it is obvious that Kimura teaches this.

Basically, that's what '391 is all about.

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It's detecting conditions that would -- for whatever reason, they are automatically or manually shut off from the passage of current to the battery from the charger.

So again, they are referring to these events as "interruptions." I'm being a bit more careful to refer to them as "events" that would lead to an interruption in the charging of the battery.

"Vehicle abnormalities" -- just a statement of what Kimura actually says. It's an exact map.

Kimura, again, adds greater detail by pointing out with respect to a threshold that, according to how it is set, is a preference. It could be exceeded or dropped below. That is set according to the type of battery.

I'm simply saying that would be obvious and a more general statement of the same thing going on in '391.

2, which says, "a preference interruption." That is a more specific example of a preference in this case. Kimura allows that different voltage thresholds for

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either constant current or termination voltage could be set via a DIP switch, which is just -- call that an embodiment of what is being claimed in all of -- within Claim 1 and then repeatedly claimed elsewhere.

In 85, another specific case, where "Kimura indicates that the charging process is terminated after detecting that 'the terminal voltage of the battery exceeds a predetermined threshold.'"

I'm saying it's obvious that they are referring to the -- what -- in Limitation 2 of Claim 1, [as read]: "responsive to detecting one or more interruptions, sending a response" -- okay. One sentence back.

{As read]: "Set of operational conditions which conform to a set of predefined interrupt conditions, wherein one or more interruptions comprise at least one of the device capability" -- go through all three categories again.

Same in 86, where they talk about "data services." Kimura's version of "data services" is -- is, again, more specific. It goes to the additional extent of talking

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about time out after a certain period, which is standard practice in design. Again, it's just more specific.

So I considered it obvious that that is within the broader class of data services interruption, as mentioned in the '391.

97, more about data services.

I'm going to move -- as you can read in my paragraphs 88, 89, 90, and 91, talking all about just more specific statements in Kimura that are the same as or more than what is being claimed in the '391.

And then Kimura, if you look in the declaration, it provides greater detail about charge termination upon an interruption initiated by -- on the vehicle side or some either condition-met purpose or an emergency shutdown request, anything that should inhibit charging.

That is -- I am interpreting it as obviously the same as, if not the overall function of '391, at least what is mentioned in Claim 1 within device capabilities, interruption, and preference interruption.

Going to jump to Claim 4 now, which

was --

MR. SHAPIRO: Let's -- let's stop here. Let's take a break. I think we've been going for over an hour and a half. Let's do -- let's just do a ten-minute break, if that's okay.

(Short break taken.)

THE WITNESS: Would you like me to continue answering your last question?

BY MR. SHAPIRO:

Q. No. I think we were done with that question.

A. Oh, no. I was just getting started.

Q. We can --

A. Because you asked about four different claims.

Q. Right.

And then we -- then we -- then we -- when we saw how -- how comprehensive your answer was, we decided to limit it to Claim 1 as an exemplary case.

A. I didn't --

Q. Okay. So, Dr. MacCarley, are -- are there any elements of Independent Claim 1 that are not disclosed in Keith but would have been obvious

in your opinion?

A. Well, let me answer that two ways.

It's my contention that Claim 1 is anticipated by Keith, which I think technically means that nothing needed to be obvious if it was already anticipated. That's a stronger criteria.

I could leave it with that, or if you have -- if you want to jump straight in and say, well, why do you think, you know, this either anticipates or is obvious, point to something -- I could -- I could be more specific in my answer.

Over to you.

Q. So is that your answer?

A. Bec- -- let me rephrase.

As I state on page 17, I felt that Claim 1 was anticipated by Keith.

So as you asked the question, did I feel anything -- did I feel the need to use obviousness to connect the dots on any of these? No.

Q. Okay.

MR. STEIN: Just for the court reporter, though, I think the last answer looks like there's a transcription error.

"It's my contention that Claim 1 isn't anticipated."

He said "is anticipated."

THE WITNESS: Oh, did I accidentally --

MR. STEIN: I think it was just a transcription error. So just want to make sure.

THE WITNESS: Yeah. I'm referring to the lowest line in section -- paragraph 42 on the bottom of page 17, where I state, "Claims 1, 2, 4 through 9, 11 through 16, and 18 through 20 are anticipated by Keith."

MR. SHAPIRO: And, Counsel, the witness will have an opportunity to review the transcript. So I'm going to just caution you against interrupting and -- and making changes to the transcript at the -- during the deposition.

BY MR. SHAPIRO:

Q. Okay. Let's go back to your declaration, Dr. MacCarley.

In paragraph 9 of your declaration, you state, "Among the most relevant courses I have taught recently is Cal Poly course EE/BRAE 434, automotive engineering for a sustainable future, 2005-2002."

Do you see that?

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A. Yes, and there's an obvious typo. It's 2005 through -- I think the last time I taught that, it's probably '12.
Q. Okay. And that was my question. Thank you.
And in paragraph 9 of your declaration, you also state that you, "founded and advised two popular student engineering clubs, the Cal Poly Electric Vehicle Engineering Club (EVAC) (since 1996) and the Future Fuels Club (since 2005)."
Do you -- do you see that?
A. Yes, that's correct.
Q. Were you involved with any other student engineering clubs?
A. Oh, yes. I mean, I -- I was at Cal Poly for over 30 years, tenured for most that time. I was advisor to the IEEE for quite a long time.
I was -- co-advisor of the S- -- the Formula SAE Racing Team, co-advised with a faculty member from ME.
I was co-advisor of the Shell Supermileage Team, in which they -- we -- in one of these years, we took first with a car that we, against all odds of thermodynamics, achieved over a thousand miles per gallon with.

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Let's see. I -- I've always been very involved -- I'm a very hands-on type person. So I've been very involved as an advisor to automotive and electric vehicle type student projects.
I think in the declaration, I did elaborate on one project that we were particularly proud of with the Electrical Vehicle Engineering Club, in which we designed and constructed and demonstrated publically an automated battery exchange system combination charging battery exchange system that could perform the entire operation in about 60 seconds without the operator even getting out of the car, which, even to this day, makes it superior to any other much, much, much more expensive technology built by any company in the world.
Q. The --
A. We did it --
Q. I'm sorry. You can finish your answer.
A. I said, we did it with an $80,000 budget.
Q. Wow. The Formula SAE Racing Team that you mentioned, is that the Cal Poly Racing Club?
A. There is no specifically named "Cal Poly Racing Club" because we, being a very practically

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oriented engineering school, have at least seven -- seven, eight, even more named racing teams for all the different collegiate competitions that we participate in.
And in the EVC, we sort of broke the mold by going outside collegiate competitions. Competed in a world-class competition and took second place in competing with a shoestring budget against teams that had -- hired IndyCar drivers and had $8 million budgets. We were very proud of that. That was our electric race car in the late '90s.
MR. SHAPIRO: Okay. Renee, do you have a way of marking a document that I move into the marked exhibits folder?
(Reporter clarifying.)
MR. SHAPIRO: Can we do -- make it -- I'm going to move an exhibit in.
Can we label it "MacCarley 001"?
MR. STEIN: Do you not want to use the next number in your 2000 sequence, Jason?
MR. SHAPIRO: No. Let's just use this for now.
I mean, if we -- if we end up using it, then we'll give it the other exhibit number.

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Let me just see if I can get this in here. All right. That's not -- -- that's not moving. Let me try this.
There we go.
(Exhibit 1 was received and marked for identification on this date and is attached hereto.)
BY MR. SHAPIRO:
Q. Go ahead and refresh your folder, and let me know when it's -- when you've got it in there.
Dr. MacCarley, are you -- are you able to see --
MR. STEIN: Before -- before we get too far, Jason, I want to object to the introduction of the exhibit on at least relevance, foundation, and scope grounds.
BY MR. SHAPIRO:
Q. Dr. MacCarley, are you -- are you able to see the exhibit?
A. I see a new file. I will attempt to open it, the one named "Our Partners, Cal Poly Racing"?
Q. Yes.
A. What you're Looking at is the Formula Baja team. And this is something from the Cal Poly webpage in which they highlight some of the

racing activities, not all of them. That --
Q. Now is -- go ahead. I'm sorry. Complete your answer.
A. That's the one entry I was not directly involved in because there's no electronics involved. This was entirely mechanical engineering, whereas the others involved either electric vehicle technologies or electronic fuel injection. That's how you get a thousand miles per gallon from an ultralight vehicle.
So you happened to bring up a frame of one that I was not involved in.
Q. Okay. Well, have any of the student engineering clubs that you've been involved with every received support from Tesla?
MR. STEIN: Objection. Form. Foundation. Scope.
THE WITNESS: Let me think about that.
We've certainly never received a financial donation.
I -- I do believe maybe about, oh, maybe ten years ago -- I'm just wildly guessing, and we received the donation of two Tesla North American standard chargers, Level 2 chargers, charge ports, for educational

purposes.
So that I -- I could use those in my classes, in which I discuss electric vehicles and the electronics of electric vehicles, which I kind of specialize in.
BY MR. SHAPIRO:
Q. Do you recall receiving any other type of support from Tesla?
MR. STEIN: Objection. Form. Foundation. Scope.
THE WITNESS: Well, now that you mentioned it -- these aren't things that I think about a lot.
I -- I have on several occasions taken student groups, either on behalf of the classes that I teach or the electric vehicle engineering club or other engineering clubs that I've been asked -- even if I'm not the primary advisor, they bring me in because I have the expertise they need.
We did, actually, visit Tesla in their earliest days when they were operating out of not much more than a garage, converting Lotus Elises to Tesla Roadsters.
And at that time, they were willing to --

they shared some of their batteries with us.
This was back in the day when they were assembling several thousand 18650 cells into their -- actually, I'm not sure that that was the correct number for the cell size. That's the one they currently use.
But we had a chance to -- I had a chance to -- with -- you know, courtesy of the engineering people, introduce them to the new future trends. This is when Tesla had recently been acquired by Mr. Musk from the original founders.
We've also multiple times been up to view their facilities in this area, including your facility in Palo Alto.
We have not received anything from them other than the courtesy of sharing their time and access to show students how they build their vehicles and chargers and -- and some of their innovative marketing too.
BY MR. SHAPIRO:
Q. Did any of the student engineering clubs that you've been involved with ever receive an offer of support from Tesla?
MR. STEIN: Objection -- same objections.

Form.
THE WITNESS: Club -- offer of support? You said, a club received an offer of support, which would -- I'll answer that in -- to the best of my knowledge, over the years that I've been involved in this area as a professor, as a teacher, I'm sure that at least 30 of my students took jobs at Tesla.
I was -- I was instrumental in forwarding my best students for a request of a recruiter from Tesla, that also happened to be one of my former students.
So being that they were one of the most advanced opportunities, one of the most prestigious for someone coming out of Cal Poly to enter in those years, I -- that type of offer of support, that is, hiring them -- something that I helped to facilitate.
But this was -- there was no financial transaction between myself and any of the clubs.
They didn't give us money, nor did they offer to give us money -- your question.
BY MR. SHAPIRO:
Q. Okay. I'm going to share another

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document that we'll mark Exhibit MacCarley 002.
Let me know when you have it, Dr. MacCarley.
A. Let me get out of -- I need to refresh.
MR. STEIN: Where did you put it, Jason, in the Exhibit Share thing?
MR. SHAPIRO: Yes. It's in the Exhibit Share.
THE WITNESS: What I'm seeing is -- I don't see Exhibit 2. I see the addition --
MR. SHAPIRO: It hasn't been marked yet.
(Exhibit 2 was received and marked for identification on this date and is attached hereto.)
BY MR. SHAPIRO:
Q. So this -- do you see the document entitled, "Rapid Battery Interchange System"?
A. Yes.
Q. By Mason Borda and dated March 5, 2012?
A. I do.
Q. Okay. Do you recognize this document?
MR. STEIN: Before we get too far, Jason, I just want to object to the introduction of the exhibit. It has not been shown to be relevant. The scope has not been

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established, and there is no foundation or authenticity.
THE WITNESS: I'm opening it.
Yeah. This was -- this was a senior project report of which there are many senior projects that come out of my club or course projects.
And this was related to that accomplishment I referred to before, in which I have to say, it was -- it was about as sophisticated a group effort as you can imagine, and it was a wonderful, collaborative effort of -- between students and myself.
If you go back in my C.V., you'll find I have several papers on automated battery exchange for electric vehicles in the 2000 era that -- published 2002 and '03, things like that.
So we were -- that's always been an interest of mine. And my implementation was volunteer with the help of students.
Again, something I'm particularly proud of because we -- we accomplished with volunteer student effort in a shoestring

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budget considerably more than a lot of incredibly well-investor-supported firms ever did.
BY MR. SHAPIRO:
Q. Dr. MacCarley, do you -- does this document that I've shared with you appear to be a true and correct copy of the senior design project report from Mason Borda?
MR. STEIN: Objection. Form.
THE WITNESS: 2012. You know, I -- I wish I could tell you that I could swear to it.
I could tell you that there's no -- I have no reason to believe that it isn't 100 percent authentic, at least from going through -- I've gone through up to the acknowledgments and -- to the best of my knowledge, looking at it, it is -- it is absolutely genuine.
You did a good job.
BY MR. SHAPIRO:
Q. So on page 20 -- can you turn to page 21 of the report, Dr. MacCarley?
A. Sure.
Q. And we're talking --

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A. I'm scrolling. It's the best I can do.
21 is in the -- okay.
Q. At the -- and I'm talking page 21 of the document itself, not the PDF. Not the PDF numbering but the document numbering.
A. I'm there. I --
Q. The first full paragraph in this report states, "Tesla has offered to donate to our club and I hope to pursue that offer to acquire lithium ion batteries for our project."
Do you see that?
A. I do. And we have -- I have been blessed with some very industrious students. I was not aware of -- that one of the students, obviously, articulate and enterprising, had received that offer.
We did not receive any lithium batteries from them. I think we could have taken it further if we did.
But our concept was sufficiently demonstrated using lead-acid batteries. If anything, more advanced batteries that were just coming online in 2012 -- they were new at the time and not -- not cheap to give away, I should point out.

They would have slightly improved the speed of our automated exchange apparatus by creating a more compact and lightweight battery module that is exchanged. That's more than you asked for but, no, I wasn't aware of that.

I can confirm we did not receive any lithium batteries from Tesla.

Q. Okay. Thank you.

Was your e-mail address at Cal Poly ever cmaccarl@tesla.elee.calpoly.edu?

MR. STEIN: Objection. Form. Foundation. Scope.

THE WITNESS: It definitely was because one of the things that I brought to Cal Poly was far more advanced knowledge of network computing when I arrived.

And Tesla was my own workstation. I purchased and built for the department and served as network administrator, basically, took care of everything for them, based upon my experience and knowledge from Purdue during my doctoral work.

And I named -- we decided to name all of our workstations after famous electrical engineers. And this is long before Elon Musk

ever thought of the idea of using the name of my workstation for his company.

So we had Gauss and Morse and Edison and you name -- Joule, Coulomb, funny names that mean nothing to most people, but they did to us because we were trying to be cute.

BY MR. SHAPIRO:

Q. Did anyone else use that e-mail domain name?

A. Well, Tesla is not the domain name. It is the second-level -- the domain name is calpoly.edu.

And so all of the addresses would appear as, like, tesla.calpoly.edu or morse.calpoly.edu, couloumb.

I am not aware of anyone else that used the name of my workstation within the Cal Poly domain.

You know, it's a big university. Hacking was in its infancy in those days. So I am not aware of anyone -- any other use of my subdomain name, which was my workstation.

MR. SHAPIRO: Okay. Counsel, I'd like to take a five-minute break, and I'll be back and let you know if I have any more

questions.

MR. STEIN: Okay. We'll see you in five.

(Short break taken.)

MR. SHAPIRO: Okay. So that's all I have at the moment. I'm going to reserve my time for more cross if you -- if you redirect.

But you can take it from here.

MR. STEIN: Okay. Well, we'll take a 15-minute break here just to talk through if we want to ask any questions. And then we'll jump back on. Maybe -- let's call it ten minutes, Jason. We'll hop back on in ten minutes. Okay?

MR. SHAPIRO: That sounds good. Thanks.

(Short break taken.)

MR. STEIN: All right. Thank you very much, Dr. MacCarley, for your time and testimony today. I have no questions.

MR. SHAPIRO: Okay. I have no further questions either.

(TIME NOTED: 11:47 a.m.)

*** ERRATA SHEET ***

NAME OF CASE: TESLA V. GRAPHITE CHARGING
DATE OF DEPOSITION: OCTOBER 17, 2024
NAME OF WITNESS: C. ARTHUR MacCARLEY
Reason Codes:

1. To clarify the record.
2. To conform to the facts.
3. To correct transcription errors.

PAGE	LINE	FROM	TO	REASON

_____

Subscribed and sworn before me
This____day of_____,20__.

_____ _____

(Notary Public) My Commission Expires:

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DECLARATION UNDER PENALTY OF PERJURY

I, C. ARTHUR MacCARLEY, do hereby certify under penalty of perjury that I have read the foregoing transcript of my deposition taken on October 17, 2024; that I have made such corrections as appear noted herein; that my testimony as contained herein, as corrected, is true and correct.

DATED this day of , 2024, at .

_____

C. ARTHUR MacCARLEY

STATE OF CALIFORNIA)
(ss.
COUNTY OF LOS ANGELES)

I, RENEE HARRIS, do hereby certify that I am a licensed Certified Shorthand Reporter, duly qualified and certified as such by the State of California;

That prior to being examined, the witness named in the foregoing deposition was by me duly sworn to testify to tell the truth, the whole truth, and nothing but the truth;

That the said deposition was by me recorded stenographically;

And the foregoing pages constitute a full, true, complete and correct record of the testimony given by the said witness;

That I am a disinterested person, not being in any way interested in the outcome of said action, or connected with, nor related to any of the parties in said action, or to their respective counsel, in any manner whatsoever.

DATED: October 25, 2024

Renee Harris, CSR, CCR, RPR
CA CSR No. 14168,
NJ CCR No. 30XI00241200

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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EXHIBIT F

Feng Xu

From: Jason Shapiro
Sent: Saturday, November 9, 2024 1:05 AM
To: Trials
Cc: Michael Siem; Nadiia Loizides; Cedric Tan; Stein, Alexander B.; pmargulies@tesla.com; Tesla-Graphite391-IPR
Subject: IPR2024-00387 Tesla, Inc. v. Graphite Charging Company LLC

Dear Honorable Board,

On November 8, 2024, Patent Owner Graphite Charging Company LLC encountered technical difficulties that prevented it from timely filing its Patent Owner Response and Exhibits 2005-2007 by the due date. Specifically, the attorney controlling the Patent Owner Response lost power at her residence about one hour before midnight and was unable to complete the filing in time to meet the deadline. When Patent Owner attempted to file the documents at about 12:15am Eastern, the P-TACTS system was down and prevented Patent Owner from completing the filing.

Patent Owner informed opposing counsel by email before midnight that it was having technical difficulties with the filing, and served copies of the Patent Owner Response and Exhibits 2005-2007 on opposing counsel at 12:27am Eastern, after learning that the P-TACTS system was down.

In view of the above, Patent Owner respectfully requests leave to file a motion for acceptance of the submission once P-TACTS is available.

Counsel for Patent Owner is available at the Board's convenience, should the Board have any questions concerning this issue.

Respectfully,
Jason Shapiro
Reg. No. 35,354
Lead Counsel for Patent Owner

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