



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/698,977	11/10/2020	10829002	INVN-00112	5976

141471 7590 10/21/2020
Stevens Law Group - Invently Automotive
1754 Technology Drive
Suite 226
San Jose, CA 95110

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 105 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Martin Koebler, Saal/Donau, GERMANY;
Invently Automotive Inc., Los Altos, CA;
Nicole G. Goldstein, Woodside, CA;
Stephen J. Brown, Woodside, CA;
Jason H. Harper, Pleasanton, CA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

141471 7590 08/07/2020
Stevens Law Group - Invently Automotive
1754 Technology Drive
Suite 226
San Jose, CA 95110

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

Tram Richards	(Typed or printed name)
/Tram Richards/	(Signature)
09/30/2020	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/698,977	09/08/2017	Martin Koebler	INVN-00112	5976

TITLE OF INVENTION: VEHICLE DESTINATION PREDICTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$500	\$0.00	\$0.00	\$500	11/09/2020

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHAFI, MUHAMMAD	3663	701-123000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. David R. Stevens
2. Stevens Law Group
3.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

INVENTLY AUTOMOTIVE INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

LOS ALTOS, CALIFORNIA

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 502421

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /David R. Stevens/

Date 09/30/2020

Typed or printed name David R. Stevens

Registration No. 38626

Electronic Patent Application Fee Transmittal				
Application Number:		15698977		
Filing Date:		08-Sep-2017		
Title of Invention:		VEHICLE DESTINATION PREDICTION		
First Named Inventor/Applicant Name:		Martin Koebler		
Filer:		David R. Stevens/TRAM RICHARDS		
Attorney Docket Number:		INVN-00112		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				500

Electronic Acknowledgement Receipt	
EFS ID:	40720056
Application Number:	15698977
International Application Number:	
Confirmation Number:	5976
Title of Invention:	VEHICLE DESTINATION PREDICTION
First Named Inventor/Applicant Name:	Martin Koebler
Customer Number:	141471
Filer:	David R. Stevens/TRAM RICHARDS
Filer Authorized By:	David R. Stevens
Attorney Docket Number:	INVN-00112
Receipt Date:	30-SEP-2020
Filing Date:	08-SEP-2017
Time Stamp:	14:24:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 500
RAM confirmation Number	E20209TE25001329
Deposit Account	502421
Authorized User	TRAM RICHARDS
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	Issue_Fee.pdf	124673	no	1
			f4ea08f1a297c1688070cf563fa41f75fb7617c0		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30027	no	2
			924028d54ddb0974be5df6285ca1f17183a209b1		

Warnings:

Information:

Total Files Size (in bytes):	154700
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

141471 7590 08/07/2020
Stevens Law Group - Invently Automotive
1754 Technology Drive
Suite 226
San Jose, CA 95110

EXAMINER

SHAFI, MUHAMMAD

ART UNIT PAPER NUMBER

3663

DATE MAILED: 08/07/2020

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/698,977	09/08/2017	Martin Koebler	INVN-00112	5976

TITLE OF INVENTION: VEHICLE DESTINATION PREDICTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$500	\$0.00	\$0.00	\$500	11/09/2020

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

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Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

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141471 7590 08/07/2020
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1754 Technology Drive
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(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/698,977	09/08/2017	Martin Koebler	INVN-00112	5976

TITLE OF INVENTION: VEHICLE DESTINATION PREDICTION

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EXAMINER	ART UNIT	CLASS-SUBCLASS
SHAFI, MUHAMMAD	3663	701-123000

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☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

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(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

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(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

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☐ Applicant asserting small entity status. See 37 CFR 1.27

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NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/698,977	09/08/2017	Martin Koebler	INVN-00112	5976
141471	7590	08/07/2020	EXAMINER	
Stevens Law Group - Invently Automotive			SHAFI, MUHAMMAD	
1754 Technology Drive			ART UNIT	
Suite 226			PAPER NUMBER	
San Jose, CA 95110			3663	

DATE MAILED: 08/07/2020

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.** Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b) (2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/698,977	Applicant(s) Koebler et al.	
	Examiner MUHAMMAD SHAFI	Art Unit 3663	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/21/2020.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☒ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-11 and 13-18. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☐ All b) ☐ Some *c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892) 2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____. 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ____. 4. ☒ Interview Summary (PTO-413), Paper No./Mail Date. <u>07/24/2020</u> .	5. ☒ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☒ Other <u>Examiner's amendment</u> .
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/MUHAMMAD SHAFI/ Primary Examiner, Art Unit 3663	
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ALLOWANCE

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Atty. Paul Johnson (Reg. # 59,375) on 07/29/2020. The application has been amended as follows:

As per Claim 1, the entire claim 1 has been replaced by the following amended claim 1 :

- 1. A power management device comprising:

a sensor interface configured to receive sensor data samples during operation of a vehicle;

a memory configured to store said sensor data samples ~~over a number of~~ for different points in time along a route segment traveled by said vehicle; and

a processor configured to (i) analyze said sensor data samples stored in said memory to detect a pattern and (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i)

at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data; and

wherein the historical data comprises: data, regarding multiple route segments, gathered from the driver's operation of the vehicle on the multiple route segments during multiple trips; data, regarding multiple sequences of route segments, gathered from the driver's operation of the vehicle on the multiple sequences of route segments during the multiple trips; and data, regarding multiple travel destinations, gathered from the driver's operation of the vehicle to the multiple travel destinations during the multiple trips.—

In Claim 2, line 1, “apparatus” has been changed to --device--

In Claim 3, line 1, “apparatus” has been changed to --device--

In Claim 4, line 1, “apparatus” has been changed to --device--

In Claim 5, line 1, “apparatus” has been changed to --device--

In Claim 5, line 2, “generate a likelihood” has been changed to --determine--

In Claim 6, line 1, “apparatus” has been changed to --device--

In Claim 7, line 1, “apparatus” has been changed to --device--

In Claim 8, line 1, “apparatus” [first occurrence] has been changed to --device—

In Claim 8, line 1, “apparatus” [second occurrence] has been changed to
--device--

In Claim 9, line 1, “apparatus” has been changed to --device--

In Claim 10, line 1, “apparatus” has been changed to --device—

In Claim 10, line 3, “apparatus” has been changed to --device--

In Claim 11, line 1, “apparatus” has been changed to –device--

In Claim 13, line 1, “apparatus” has been changed to --device—

In Claim 14, line 1, “apparatus” has been changed to –device--

In Claim 17, line 1, “an apparatus” has been changed to – a device--

In Claim 18, line 1, “apparatus” has been changed to --device—

As per Claim 15, the entire claim 15 has been replaced by the following amended claim 15 :

--15. A method performed by a processor for predicting a destination of a vehicle, comprising the steps of:

(A) monitoring a plurality of sensors to generate sensor data samples during operation of a vehicle;

(B) storing said sensor data samples for different points in time along a route segment traveled by said vehicle;

(C) analyzing said sensor data samples to detect a pattern; and

(D) predicting a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data;

wherein the historical data comprises: data, regarding multiple route segments, gathered from the driver’s operation of the vehicle on the multiple route segments during multiple trips; data, regarding multiple sequences of route segments, gathered from the driver’s operation of the vehicle on the multiple sequences of route segments

during the multiple trips; and data, regarding multiple travel destinations, gathered from the driver's operation of the vehicle to the multiple travel destinations during the multiple trips.--

As per Claim 16, the entire claim 16 has been replaced by the following amended claim 16 :

--16. A vehicle comprising:

a power train;

a drive train;

a sensor interface configured to receive sensor data samples during operation of a vehicle;

a storage device configured to store said sensor data samples ~~over a number of~~ for different points in time along a route segment traveled by said vehicle; and

a processor configured to (i) analyze said sensor data samples stored in said storage device to detect a pattern and (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data;

wherein the historical data comprises: data, regarding multiple route segments, gathered from the driver's operation of the vehicle on the multiple route segments during multiple trips; data, regarding multiple sequences of route segments, gathered from the driver's operation of the vehicle on the multiple sequences of route segments during the multiple trips; and data, regarding multiple travel destinations, gathered from

the driver's operation of the vehicle to the multiple travel destinations during the multiple trips.--

3. **Claims 12 and 19-20 are cancelled by Examiner's amendment.**

Allowable Subject Matter

4. **Remaining Claims 1-11 and 13-18 are allowed.**

REASONS FOR ALLOWANCE

5. The following is an examiner's statement of reasons for allowance:

The prior arts of record fail to teach, make obvious , or suggest, a vehicle, (equipped with) a power management device and a method comprising, among other limitations, monitoring a plurality of sensors to generate sensor data samples during operation of a vehicle; storing said sensor data samples for different points in time along a route segment traveled by said vehicle; analyzing said sensor data samples to detect a pattern; and predicting a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data; wherein the historical data comprises: data, regarding multiple route segments, gathered from the driver's operation of the vehicle on the multiple route segments during multiple trips; data, regarding multiple sequences of route segments, gathered from the driver's operation of the vehicle on the multiple sequences of route segments during the multiple trips; and data, regarding multiple

travel destinations, gathered from the driver's operation of the vehicle to the multiple travel destinations during the multiple trips.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUHAMMAD SHAFI whose telephone number is (571)270-5741. The examiner can normally be reached on M-F 8:30 am -5:00 pm.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on 571-272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <https://ppair-my.uspto.gov/pair/PrivatePair>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**/MUHAMMAD SHAFI/
Primary Examiner, Art Unit 3663**

<i>Examiner-Initiated Interview Summary</i>	Application No. 15/698,977	Applicant(s) Koebler et al.		
	Examiner MUHAMMAD SHAFI	Art Unit 3663	AIA (First Inventor to File) Status No	Page 1 of 2

All participants (applicant, applicants representative, PTO personnel):

1. MUHAMMAD SHAFI (Primary Examiner);
Telephonic

2. Atty. Paul Johnson (Attorney: Reg.#59,375);
Telephonic

Date of Interview: 24 July 2020

Claims Discussed: yes

Amendment proposed: yes

Brief Description of the main topic(s) of discussion: Examiner called Atty. Johnson to discuss claim limitations , 101 issue of claim 15 . 112 (a) issue with claims 1 and 17, 112 (b) issue with claims 1, 5, 15 and 16 . Claims were argued. Examiner offered examiner's amendment to claims. Atty. Johnson indicated that he would look into that, and would get back with office.

On 7/29 Atty. Johnson contacted the office, claims were discussed, Atty. Johnson agreed to examiner's amendment . An agreement was reached.

Issues Discussed:

Proposed Amendments:

Attachment(s): Proposed Amendments,

/MUHAMMAD SHAFI/ Primary Examiner, Art Unit 3663	
Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04 Please further see: MPEP 713.04 Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b) 37 CFR § 1.2 Business to be transacted in writing	

U.S. Patent and Trademark Office
PTOL-413/413b (Rev. 01/01/2015)

Interview Summary

Paper No. 20200712

Applicant recordation instructions:It is not necessary for applicant to provide a separate record of the substance of interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

<i>Notice of References Cited</i>	Application/Control No. 15/698,977		Applicant(s)/Patent Under Reexamination Koebler et al.	
	Examiner MUHAMMAD SHAFI		Art Unit 3663	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6169495-B1	01-2001	Koike; Shin	B61L27/0016	340/435
*	B	US-5818356-A	10-1998	Schuessler; Robert	G01C21/3446	340/995.12
*	C	US-20070282638-A1	12-2007	Surovy; Martin	G06Q40/02	705/4
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

CPC - Searched*		
Symbol	Date	Examiner
(B60L58/12 or G01C21/3469 or B60L15/2045 or B60W50/0097 or B60T13/586 or G07C5/085 or B60T7/18 or G08G1/096775 or G01C21/3617 or G08G1/096844 or B60T1/10 or B60W30/143 or B60T7/22 or B60W10/06 or B60W10/11 or B60L3/12 or B60L7/12 or B60L8/003 or B60L50/62 or B60L58/16 or B60K35/00 or G06F7/00 or B60W2552/20 or B60W2556/50 or B60T2210/36 or B60W2530/14 or B60T2201/04 or Y02T90/161 or Y02T10/52 or G07C5/008 or Y02T10/7283 or B60L2240/12 or B60L2240/441 or B60L2240/667 or B60L2240/445 or B60L2240/645 or B60L2240/662 or B60L2240/647 or B60L2240/443 or B60L2260/28 or B60L2240/622 or B60L2240/545 or B60L2240/549 or B60L2220/44 or B60L2240/547 or B60L2260/50 or B60L2240/68 or B60L2240/642 or B60L2250/16 or B60L2250/10 or B60L2240/421 or B60L2240/423 or B60L2240/665 or Y02T90/162 or Y02T10/7005 or Y02T10/6217 or Y02T90/16 or Y02T10/7044 or Y02T10/7291 or Y02T10/705 or Y02T10/7077 or Y02T10/7083 or Y02T10/72 or Y02T10/645 or B60K2370/15 or B60K2370/174 or B60W20/12)	07/25/2020	ms

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<i>Search Notes</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
B60K 2350/1056, 1092, 1076	12/26/2018	ejp
B60K35/00	12/26/2018	ejp
B60W 30/00, 095	12/26/2018	ejp
B60W 40/00, 02, 04, 06, 072, 09	12/26/2018	ejp
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<i>Search Notes</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

US Classification - Searched*			
Class	Subclass	Date	Examiner
701	123	07/25/2020	ms

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Reviewed PLUS results	12/26/2018	ejp
EAST text and image search (CPC sets searched in part)	12/26/2018	ejp
Updated EAST search results	10/13/2019	ejp
		ms
UPdated East Search	07/25/2020	ms
Updated Inventor Search	07/25/2020	ms
Updated Text Search	07/25/2020	ms
Updated CPC Search	07/25/2020	ms

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	PG PUB CLAIM TEXT Search—See Interference Search printout	07/25/2020	ms

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Issue Classification 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

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B60W	/	50	/	0097	I	2013-01-01
B60T	/	13	/	586	I	2013-01-01
G07C	/	5	/	085	I	2013-01-01
B60T	/	7	/	18	I	2013-01-01
G08G	/	1	/	096775	I	2013-01-01
G01C	/	21	/	3617	I	2013-01-01
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NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/MUHAMMAD SHAFI/ Primary Examiner, Art Unit 3663	25 July 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

Issue Classification 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

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NONE		Total Claims Allowed:	
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/MUHAMMAD SHAFI/ Primary Examiner, Art Unit 3663	25 July 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

<i>Issue Classification</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

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/MUHAMMAD SHAFI/ Primary Examiner, Art Unit 3663	25 July 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

Issue Classification 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

INTERNATIONAL CLASSIFICATION			
CLAIMED			
B60L		58	12
NON-CLAIMED			

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
701	123

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					
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NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	17	
/MUHAMMAD SHAFI/ Primary Examiner, Art Unit 3663	25 July 2020	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	10

Issue Classification 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner MUHAMMAD SHAFI	Art Unit 3663

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
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2	2	11	11	-	20										
3	3	-	12												
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6	6	15	15												
7	7	16	16												
8	8	17	17												
9	9	14	18												

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 17	
/MUHAMMAD SHAFI/ Primary Examiner, Art Unit 3663 (Primary Examiner) _____ (Date) 25 July 2020		O.G. Print Claim(s) 1	O.G. Print Figure 10

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
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S3	470,440	S1 or S2	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2020/07/02 18:37

			DERWENT; IBM_TDB			
S4	127	((koebler) near2 (martin)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:21
S5	44	((goldstein) near2 (nicole)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:21
S6	5,091	((brown) near2 (stephen)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:21
S7	246	((harper) near2 (jason)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:22
S8	5,376	S4 or S5 or S6 or S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:22
S9	1,520	701/123.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:22
S10	469,579	(B60L58/12 or G01C21/3469 or B60L15/2045 or B60W50/0097 or B60T13/586 or G07C5/085 or B60T7/18 or G08G1/096775 or G01C21/3617 or G08G1/096844 or B60T1/10 or B60W30/143 or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2020/07/03 18:22

		B60T7/22 or B60W10/06 or B60W10/11 or B60L3/12 or B60L7/12 or B60L8/003 or B60L50/62 or B60L58/16 or B60K35/00 or G06F7/00 or B60W2552/20 or B60W2556/50 or B60T2210/36 or B60W2530/14 or B60T2201/04 or Y02T90/161 or Y02T10/52 or G07C5/008 or Y02T10/7283 or B60L2240/12 or B60L2240/441 or B60L2240/667 or B60L2240/445 or B60L2240/645 or B60L2240/662 or B60L2240/647 or B60L2240/443 or B60L2260/28 or B60L2240/622 or B60L2240/545 or B60L2240/549 or B60L2220/44 or B60L2240/547 or B60L2260/50 or B60L2240/68 or B60L2240/642 or B60L2250/16 or B60L2250/10 or B60L2240/421 or B60L2240/423 or B60L2240/665 or Y02T90/162 or Y02T10/7005 or Y02T10/6217 or Y02T90/16 or Y02T10/7044 or Y02T10/7291 or Y02T10/705 or Y02T10/7077 or Y02T10/7083 or Y02T10/72 or Y02T10/645 or B60K2370/15 or B60K2370/174 or B60W20/12).cpc.	DERWENT; IBM_TDB			
S11	470,440	S9 or S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:22
S12	52	S8 and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/03 18:22
S13	1	("20030015358").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/03 18:23
S14	101,282	(hybrid adj2 electric adj2 vehicle)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:12

S15	0	(hybrid adj2 electric adj2 vehicle) near5 analyz\$4 near5 data near5 (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:14
S16	0	(hybrid adj2 electric adj2 vehicle) same analyz\$4 same data same (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:14
S17	0	(hybrid adj2 electric adj2 vehicle) same analyz\$4 same data same (history)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:14
S18	3	((("20070282638") or ("6169495") or ("5818356"))).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/04 13:19
S19	121	("5182555" "5187510" "5317311" "5402117" "5406490" "5428545").PN. OR ("5818356").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/04 13:19
S20	0	analyz\$4 same data same (historyic adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:20
S21	0	(module or program or controlelr) near5 detect near5 (historyic adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:21
S22	0	(module or program or controlelr) near5 detect near5 (historic adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:21

S23	3,880	(module or program or controlelr) near5 detect near5 (pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:21
S24	64	(module or program or controlelr) near5 detect near5 (driv\$4) near5 (pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:22
S25	0	(module or program or controlelr) near5 detect near5 (driv\$4) near5 (pattern) near5 predict\$4 near7 (future adj2 condition)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:23
S26	0	(module or program or controlelr) near5 detect near5 (driv\$4) near5 (pattern) near5 efficiency near5 reduc\$4 near6 (power adj2 usage)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:25
S27	0	((module or program or controller) near5 detect near5 (driv\$4) near5 (pattern) near5 efficiency near5 reduc\$4 near6 (power adj2 usage))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:26
S28	0	(module or program or controlelr) near5 detect near5 (driv\$4) near5 (pattern) near5 efficiency	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:26
S29	0	(hybrid adj2 vehicle) near6 (module or program or controller) near5 detect near5 vehicle near5 (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:28

S30	0	(hybrid adj2 vehicle) near6 (module or program or controller) near5 detect near5 vehicle near5 (historical adj2 pattern) near5 efficiency near5 reduc\$4 near6 (power adj2 usage)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:30
S31	0	(hybrid adj2 vehicle) near6 (module or program or controller) near5 detect near5 vehicle near5 (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:31
S32	0	(hybrid adj2 vehicle) same (module or program or controller) same detect same vehicle same (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:31
S33	44	detect same vehicle same (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:31
S34	0	detect same (hybrid adj2 vehicle) same (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:32
S35	44	detect same vehicle same (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:38
S36	826	vehicle same (historical adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:38

S37	4	((("20060142972") or ("20050288856") or ("20040246147") or ("20030050754")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/04 13:49
S38	0	S37 and (efficiency same reduce same (power adj2 usage))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:50
S39	0	S36 and (efficiency same reduce same (power adj2 usage))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 13:50
S40	5	((("20040088095") or ("20030033069") or ("20030015358") or ("6370472") or ("6169495")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/04 14:15
S41	6	((("20040088095") or ("20030033069") or ("20030015358") or ("6470240") or ("6370472") or ("6169495")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/04 14:16
S42	0	S41 and (efficiency same reduce same (power adj2 usage))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 14:17
S43	0	((hybrid adj2 vehicle) near6 (module or program or controller) near5 detect near5 vehicle near5 (historical adj2 pattern) same efficiency same reduc\$4 near6 (power adj2 usage) same ratio same (energy adj2 usage))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/04 14:50
S47	49	((("4625210") or ("5734316") or ("6169495") or ("5477217") or ("5959572") or ("6098048") or ("4768916") or ("4797049") or ("4833442") or ("5026153") or ("5231253") or ("5702223") or ("5808372") or ("5809480") or ("5878361") or ("5928294") or ("5964572") or ("6059899") or ("6059899") or ("6122571") or ("4284941") or ("4403208") or ("4469210") or ("4621856") or ("4775939") or ("5222906") or	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/07 09:35

		("5254996") or ("5360287") or ("5415505") or ("5454672") or ("5469676") or ("5525026") or ("5540158") or ("5589827") or ("5628596") or ("5634339") or ("5711368") or ("5732785") or ("5775858") or ("5777451") or ("5777565") or ("5818356") or ("5838251") or ("5846045") or ("5854987") or ("5863026") or ("5864831") or ("5873250") or ("5878362") or ("5896554")).PN.				
S48	1	("20040230376").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/07 14:27
S49	1	("6169495").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/07 16:21
S50	1,520	701/123.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:25
S51	469,792	(B60L58/12 or G01C21/3469 or B60L15/2045 or B60W50/0097 or B60T13/586 or G07C5/085 or B60T7/18 or G08G1/096775 or G01C21/3617 or G08G1/096844 or B60T1/10 or B60W30/143 or B60T7/22 or B60W10/06 or B60W10/11 or B60L3/12 or B60L7/12 or B60L8/003 or B60L50/62 or B60L58/16 or B60K35/00 or G06F7/00 or B60W2552/20 or B60W2556/50 or B60T2210/36 or B60W2530/14 or B60T2201/04 or Y02T90/161 or Y02T10/52 or G07C5/008 or Y02T10/7283 or B60L2240/12 or B60L2240/441 or B60L2240/667 or B60L2240/445 or B60L2240/645 or B60L2240/662 or B60L2240/647 or B60L2240/443 or B60L2260/28 or B60L2240/622 or B60L2240/545 or B60L2240/549 or B60L2220/44 or B60L2240/547 or B60L2260/50 or B60L2240/68 or B60L2240/642 or B60L2250/16 or B60L2250/10 or B60L2240/421 or B60L2240/423 or B60L2240/665 or Y02T90/162 or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:25

		Y02T10/7005 or Y02T10/6217 or Y02T90/16 or Y02T10/7044 or Y02T10/7291 or Y02T10/705 or Y02T10/7077 or Y02T10/7083 or Y02T10/72 or Y02T10/645 or B60K2370/15 or B60K2370/174 or B60W20/12).cpc.				
S52	470,653	S50 or S51	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:25
S53	127	((koebler) near2 (martin)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:26
S54	44	((goldstein) near2 (nicole)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:26
S55	5,092	((brown) near2 (stephen)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:26
S56	246	((harper) near2 (jason)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:26
S57	5,377	S53 or S54 or S55 or S56	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 18:26

S58	1	("6169495").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/10 18:34
S59	0	predict\$4 near5 destination near5 (driving adj2 pattern) near5 (historic adj2 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 19:12
S60	15	predict\$4 near5 destination near5 (driving adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 19:13
S61	42	predict\$4 near5 destination near5 (driving adj2 history)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/10 19:18
S62	4	((("6169495") or ("6470240") or ("20040230376") or ("20040088095")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/11 12:58
S63	0	S62 and ((hybrid adj2 vehicle) near6 (module or program or controller) near5 detect near5 vehicle near5 (historical adj2 pattern) same efficiency same reduc\$4 near6 (power adj2 usage) same ratio same (energy adj2 usage))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 12:59
S64	1,520	701/123.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:01
S65	469,939	(B60L58/12 or G01C21/3469 or B60L15/2045 or B60W50/0097 or B60T13/586 or G07C5/085 or B60T7/18 or G08G1/096775 or G01C21/3617 or G08G1/096844 or B60T1/10 or B60W30/143 or B60T7/22 or B60W10/06 or B60W10/11 or B60L3/12 or B60L7/12 or B60L8/003 or B60L50/62 or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:01

		B60L58/16 or B60K35/00 or G06F7/00 or B60W2552/20 or B60W2556/50 or B60T2210/36 or B60W2530/14 or B60T2201/04 or Y02T90/161 or Y02T10/52 or G07C5/008 or Y02T10/7283 or B60L2240/12 or B60L2240/441 or B60L2240/667 or B60L2240/445 or B60L2240/645 or B60L2240/662 or B60L2240/647 or B60L2240/443 or B60L2260/28 or B60L2240/622 or B60L2240/545 or B60L2240/549 or B60L2220/44 or B60L2240/547 or B60L2260/50 or B60L2240/68 or B60L2240/642 or B60L2250/16 or B60L2250/10 or B60L2240/421 or B60L2240/423 or B60L2240/665 or Y02T90/162 or Y02T10/7005 or Y02T10/6217 or Y02T90/16 or Y02T10/7044 or Y02T10/7291 or Y02T10/705 or Y02T10/7077 or Y02T10/7083 or Y02T10/72 or Y02T10/645 or B60K2370/15 or B60K2370/174 or B60W20/12).cpc.				
S66	470,800	S64 or S65	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:01
S67	127	((koebler) near2 (martin)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:01
S68	44	((goldstein) near2 (nicole)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:01
S69	5,092	((brown) near2 (stephen)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2020/07/11 13:01

			DERWENT; IBM_TDB			
S70	246	((harper) near2 (jason)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:01
S71	5,377	S67 or S68 or S69 or S70	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:01
S72	52	S66 and S71	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:04
S73	2	stor\$4 near5 (sensor adj2 data) near5 (different adj2 point)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:06
S74	2	stor\$4 near5 (sensor adj2 data) near7 (different adj2 point)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:07
S75	235	stor\$4 same (sensor adj2 data) same (different adj2 point)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:07
S76	202	stor\$4 same (sensor adj2 data) same (different adj2 point) same time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2020/07/11 13:08

			DERWENT; IBM_TDB			
S77	28	vehicle same stor\$4 same (sensor adj2 data) same (different adj2 point) same time	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:09
S78	0	(vehicle near5 stor\$4 near5 (sensor adj2 data) near5(different adj2 point) near5 time)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:14
S79	4	(controller or progarm or software) near5 analyz\$4 near4 data near5 determin\$4 near5 (current adj2 (velocity or speed))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:18
S80	0	(controller or progarm or software) near5 analyz\$4 near4 data near5 determin\$4 near5 (current adj2 (velocity or speed) near5 creat\$4 near5 (route adj2 history))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:20
S81	0	(controller or progarm or software) near5 analyz\$4 near4 data near5 determin\$4 near5 (current adj2 (velocity or speed) near5 (route adj2 segment) near5 creat\$4 near5 (route adj2 history))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 13:20
S85	0	(controller or progarm or software) near5 analyz\$4 near4 data near5 determin\$4 near5 (current adj2 (velocity or speed) near5 (route adj2 segment) near5 upload near5 (remote database))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 17:32
S86	4	((("6169495") or ("6470240") or ("20040230376") or ("20040088095")).PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/11 17:58
S87	25,853	telemetry system	US-PGPUB; USPAT;	ADJ	ON	2020/07/11 18:02

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S88	35	receiv\$4 near5 (sensor adj2 data) near5 (telemetry adj2 system)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:03
S89	1	receiv\$4 near5 (sensor adj2 data) near5 (telemetry adj2 system) near5 vehicle	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:03
S90	1	receiv\$4 near5 vehicle near5 (sensor adj2 data) near5 (telemetry adj2 system)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:07
S91	0	(receiv\$4 near5 vehicle near5 (sensor adj2 data) near5 (telemetry adj2 system) near5 analyz\$4 same data same determin\$4 same speed)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:10
S92	31	vehicle near5 connect\$5 near5 (remote adj database)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:14
S93	0	vehicle near5 connect\$5 near5 (remote adj database) near5 (driving adj2 history)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:19
S94	0	(vehicle near5 connect\$5 near5 (remote adj database) near5 stor\$4 near5 (driving adj2 history))	US-PGPUB; USPAT; USOCR;	ADJ	ON	2020/07/11 18:21

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S95	0	(vehicle near5 connect\$5 near5 (remote adj database) near5 stor\$4 near5 (driving adj2 history) near5 analyz\$5 near5 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:22
S96	0	(vehicle near5 connect\$5 near5 (remote adj database) near5 stor\$4 near5 (sensor adj2 data) near5 (driving adj2 history) near5 analyz\$5 near5 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/11 18:23
S101	0	determin\$4 near5 space near5 vehicle near5 (optical adj2 sensor) same (audio adj2 sensor)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/15 17:03
S102	38	vehicle near5 (optical adj2 sensor) same (audio adj2 sensor)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/15 17:04
S103	51	vehicle near7 (optical adj2 sensor) same (audio adj2 sensor)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/15 17:05
S104	1	15/712291	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/07/15 17:58
S105	0	((vehicle near5 connect\$5 near5 (remote adj database) near5 telemetry near5 stor\$4 near5 (sensor adj2 data) near5 (driving adj2 history)	US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	2020/07/23 10:28

		near5 (route adj2 segment) nera5 analyz\$5 near5 data))	JPO; DERWENT; IBM_TDB			
S106	0	((vehicle near5 connect\$5 near5 (remote adj database) near5 telemetry near5 stor\$4 near5 (sensor adj2 data) near5 (driving adj2 history) near5 (route adj2 segment) near5 analyz\$5 near5 data))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/23 10:29
S108	0	14/711212	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/23 16:01
S109	0	14/711124	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/23 16:01
S110	1	("20180010840").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/23 16:02
S111	1	("20180065484").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/23 16:03
S112	1,520	701/123.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:50
S113	470,640	(B60L58/12 or G01C21/3469 or B60L15/2045 or B60W50/0097 or B60T13/586 or G07C5/085 or B60T7/18 or G08G1/096775 or G01C21/3617 or G08G1/096844 or B60T1/10 or B60W30/143 or B60T7/22 or B60W10/06 or B60W10/11 or B60L3/12 or B60L7/12 or B60L8/003 or B60L50/62 or B60L58/16 or B60K35/00 or G06F7/00 or B60W2552/20 or B60W2556/50 or B60T2210/36 or B60W2530/14 or B60T2201/04 or Y02T90/161 or	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:50

		Y02T10/52 or G07C5/008 or Y02T10/7283 or B60L2240/12 or B60L2240/441 or B60L2240/667 or B60L2240/445 or B60L2240/645 or B60L2240/662 or B60L2240/647 or B60L2240/443 or B60L2260/28 or B60L2240/622 or B60L2240/545 or B60L2240/549 or B60L2220/44 or B60L2240/547 or B60L2260/50 or B60L2240/68 or B60L2240/642 or B60L2250/16 or B60L2250/10 or B60L2240/421 or B60L2240/423 or B60L2240/665 or Y02T90/162 or Y02T10/7005 or Y02T10/6217 or Y02T90/16 or Y02T10/7044 or Y02T10/7291 or Y02T10/705 or Y02T10/7077 or Y02T10/7083 or Y02T10/72 or Y02T10/645 or B60K2370/15 or B60K2370/174 or B60W20/12).cpc.				
S114	471,501	S112 or S113	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:50
S115	127	((koebler) near2 (martin)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:52
S116	44	((goldstein) near2 (nicole)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:52
S117	5,093	((brown) near2 (stephen)).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:52
S118	247	((harper) near2 (jason)).in.	US-PGPUB; USPAT; USOCR;	ADJ	ON	2020/07/25 09:52

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S119	5,379	S115 or S116 or S117 or S118	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:52
S120	0	(module or program or controller) near5 analyze\$5 near5 (sensor adj2 data) near6 (historic adj2 pattern)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:53
S121	0	(module or program or controller) near5 analyze\$5 near5 (sensor adj2 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:53
S122	2,756	(module or program or controller) near5 analyze\$5 near5 (sensor adj2 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:53
S123	0	(module or program or controller) near5 analyze\$5 near5 (sensor adj2 data) same (telemetry adj2 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:54
S124	1	(module or program or controller) near5 analyze\$5 near5 (sensor adj2 data) same (trip adj2 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 09:55
S125	0	(module or program or controller) near5 analyze\$5 near5 (sensor adj2 data) same (trip adj2 data) same (route adj2 segment)	US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	2020/07/25 10:00

			JPO; DERWENT; IBM_TDB			
S126	0	(module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (route adj2 segment) same (multiple adj2 trip)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:00
S127	0	(module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (route adj2 segment) same (multiple adj2 sequence) same (multiple adj2 trip)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:01
S128	0	(module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (route adj2 segment) same (multiple adj2 sequence) same (multiple adj2 trip) same destination	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:02
S129	0	(module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (route adj2 segment) same (multiple adj2 sequence) same (multiple adj2 trip) same destination	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:17
S130	52	S114 and S119	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:18
S131	35	S130 and (analyz\$5 near5 (sensor adj2 data))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:18
S132	35	S130 and (analyz\$5 near5 (sensor adj2 data)) and (telemetry adj2 data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2020/07/25 10:19

			DERWENT; IBM_TDB			
S133	35	S130 and (analyz\$5 near5 (sensor adj2 data)) and (telemetry adj2 data) and (route adj2 segment)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:19
S134	35	S130 and (analyz\$5 near5 (sensor adj2 data)) and (telemetry adj2 data) and (route adj2 segment) and trip and destination	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:19
S135	0	S130 and (analyz\$5 near5 (sensor adj2 data)) and (telemetry adj2 data) and (route adj2 segment) and (multiple adj2 trip) and (multiple adj2 destination)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:21
S136	0	S130 and (analyz\$5 near5 (sensor adj2 data)) and (telemetry adj2 data) and (route adj2 segment) and (multiple adj2 trip) and (destination)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:21
S137	35	S130 and (analyz\$5 near5 (sensor adj2 data)) and (telemetry adj2 data) and (route adj2 segment) and (trip) and (destination)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:21
S138	0	S130 and (analyz\$5 near5 (sensor adj2 data)) and (telemetry adj2 data) and (route adj2 segment) and (multiple adj2 trip) and (multiple adj2 destination)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2020/07/25 10:22
S139	0	(module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (telemetry adj2 data) same (route adj2 segment) same (multiple adj2 sequence) same (multiple adj2 trip) same destination	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	ADJ	ON	2020/07/25 10:23

			DERWENT; IBM_TDB			
S140	1	("20180037117").PN.	US-PGPUB; USPAT; USOCR	OR	OFF	2020/07/25 11:00

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	((module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (telemetry adj2 data) same (route adj2 segment) same (multiple adj2 sequence) same (multiple adj2 trip) same (multiple adj2 destination)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/08/01 10:27
S44	0	((module or program or controller) near5 detect near5 (driv\$4) near5 (pattern) near5 efficiency near5 reduc\$4 near6 (power adj2 usage)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/04 13:26
S45	0	((hybrid adj2 vehicle) near6 (module or program or controller) near5 detect near5 vehicle near5 (historical adj2 pattern) near5 efficiency near5 reduc\$4 near6 (power adj2 usage)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/04 13:30
S46	0	((hybrid adj2 vehicle) near6 (module or program or controller) near5 detect near5 vehicle near5 (historical adj2 pattern) same efficiency same reduc\$4 near6 (power adj2 usage) same ratio same (energy adj2 usage)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/04 14:51
S82	6	(vehicle same stor\$4 same (sensor adj2 data) same (different adj2 point) same time).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/11 13:10
S83	0	(vehicle near5 stor\$4 near5 (sensor adj2 data) near5(different adj2 point) near5 time).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/11 13:14
S84	0	(controller or progarm or software) near5 analyz\$4 near4 data near5 determin\$4 near5 (current adj2 (velocity or speed) near5 (route adj2 segment) near5 creat\$4 near5 (route adj2 history)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/11 13:21
S97	1	(receiv\$4 near5 vehicle near5 (sensor adj2 data) near5 (telemetry adj2 system)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/11 18:07
S98	0	((receiv\$4 near5 vehicle near5 (sensor adj2 data) near5 (telemetry adj2 system) near5	US-PGPUB; USPAT	ADJ	ON	2020/07/11 18:10

		analyz\$4 same data same determin\$4 same speed)).clm.				
S99	0	((vehicle near5 connect\$5 near5 (remote adj database) near5 (driving adj2 history)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/11 18:20
S100	0	((vehicle near5 connect\$5 near5 (remote adj database) near5 stor\$4 near5 (sensor adj2 data) near5 (driving adj2 history) near5 analyz\$5 near5 data)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/11 18:24
S107	0	((vehicle near5 connect\$5 near5 (remote adj database) near5 telemetry near5 stor\$4 near5 (sensor adj2 data) near5 (driving adj2 history) near5 (route adj2 segment) near5 analyz\$5 near5 data)).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/23 10:29
S141	0	((module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (telemetry adj2 data) same (route adj2 segment) same (multiple adj2 sequence) same (multiple adj2 trip) same destination).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/25 10:24
S142	0	((module or program or controller) near5 analyz\$5 near5 (sensor adj2 data) same (telemetry adj2 data) same (route adj2 segment) same (multiple adj2 trip) same destination).clm.	US-PGPUB; USPAT	ADJ	ON	2020/07/25 10:24

8/1/2020 10:28:18 AM

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BIB DATA SHEET

CONFIRMATION NO. 5976

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
15/698,977	09/08/2017	701	3663	INVN-00112		
APPLICANTS Invently Automotive Inc., Los Altos, CA; INVENTORS Martin Koebler, Saal/Donau, GERMANY; Nicole G. Goldstein, Woodside, CA; Stephen J. Brown, Woodside, CA; Jason H. Harper, Pleasanton, CA;						
** CONTINUING DATA ***** This application is a CON of 15/626,676 06/19/2017 which is a CON of 14/566,848 12/11/2014 PAT 9682624 which is a CON of 14/206,138 03/12/2014 PAT 8972162 which is a CON of 13/066,189 04/08/2011 PAT 8712650 which is a CIP of 11/283,137 11/17/2005 PAT 7925426						
** FOREIGN APPLICATIONS *****						
** IF REQUIRED, FOREIGN FILING LICENSE GRANTED *** SMALL ENTITY ** 10/18/2017						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and Acknowledged <u>/MUHAMMAD SHAFI/</u> Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY GERMANY	SHEETS DRAWINGS 15	TOTAL CLAIMS 17	INDEPENDENT CLAIMS 3
ADDRESS Stevens Law Group - Invently Automotive 1754 Technology Drive Suite 226 San Jose, CA 95110 UNITED STATES						
TITLE VEHICLE DESTINATION PREDICTION						
FILING FEE RECEIVED 800	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named

Inventor: Martin Koebler

Art Unit: 3663

Serial No: 15/698,977

Examiner: Edward J. Pipala

Filed: September 8, 2017

Title: VEHICLE DESTINATION PREDICTION

* * *

RESPONSE

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In response to the non-final Office action mailed October 18, 2019 in connection with the above-referenced patent application, Applicant respectfully requests reconsideration in view of the following remarks.

IN THE CLAIMS

Please add new claims 18-20 as shown in the complete set of claims below.

1. (Original) An apparatus comprising:

a sensor interface configured to receive sensor data samples during operation of a vehicle;

a memory configured to store said sensor data samples over a number of points in time;

and

a processor configured to (i) analyze said sensor data samples stored in said memory to detect a pattern and (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data.
2. (Original) The apparatus according to claim 1, wherein said telemetry data comprises map coordinates determined in response to a GPS signal.
3. (Original) The apparatus according to claim 1, wherein said telemetry data comprises map coordinates determined by a map service.
4. (Original) The apparatus according to claim 1, wherein said destination of said driver is predicted based on statistical destination logic.

5. (Original) The apparatus according to claim 1, wherein said processor is further configured to generate a likelihood that a particular driver is operating said vehicle based on said pattern detected.

6. (Original) The apparatus according to claim 1, wherein said telemetry data is used to determine route segments.

7. (Original) The apparatus according to claim 6, wherein said pattern comprises which of said route segments said vehicle has traveled.

8. (Original) The apparatus according to claim 1, wherein said apparatus is further configured to transmit said predicted destination to a remote database.

9. (Original) The apparatus according to claim 8, wherein said remote database is configured to receive a plurality of said predicted destinations and generate guidance information based on said plurality of said predicted destinations.

10. (Original) The apparatus according to claim 8, wherein said remote database is configured to (i) receive said sensor data samples and store said sensor data samples as said historical data and (ii) present said historical data to said apparatus.

11. (Original) The apparatus according to claim 1, wherein said memory is further configured to store said historical data.

12. (Original) The apparatus according to claim 1, wherein said historical data comprises route segments traveled, a sequence of route segments traveled and travel destinations.

13. (Original) The apparatus according to claim 1, wherein said historical data comprises information about operation of said vehicle.

14. (Original) The apparatus according to claim 1, wherein at least one of said sensor data samples comprises a data sample from an optical sensor.

15. (Original) A method for predicting a destination of a vehicle, comprising the steps of:
(A) monitoring a plurality of sensors to generate sensor data samples during operation of a vehicle;

(B) storing said sensor data samples over a number of points in time;

(C) analyzing said sensor data samples to detect a pattern; and

(D) predicting a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data.

16. (Original) A vehicle comprising:

a power train;

a drive train;

a sensor interface configured to receive sensor data samples during operation of a vehicle;

a storage device configured to store said sensor data samples over a number of points in time; and

a processing device configured to (i) analyze said sensor data samples stored in said storage device to detect a pattern and (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data.

17. (Original) The vehicle according to claim 16, further comprising: an apparatus configured to (i) receive said predicted destination and (ii) adapt an operation of said vehicle based on said predicted destination.

18. (New) The apparatus of claim 1, wherein the historical data comprises data gathered from multiple trips of the driver's operation of the vehicle.

19. (New) The apparatus of claim 12, wherein the historical data comprises: data, regarding multiple route segments, gathered from the driver's operation of the vehicle on the multiple route segments during multiple trips; data, regarding multiple sequences of route

segments, gathered from the driver's operation of the vehicle on the multiple sequences of route segments during the multiple trips; and data, regarding multiple travel destinations, gathered from the driver's operation of the vehicle to the multiple travel destinations during the multiple trips.

20. (New) The method of claim 15, wherein the historical data comprises: data, regarding multiple route segments, gathered from the driver's operation of the vehicle on the multiple route segments during multiple trips; data, regarding multiple sequences of route segments, gathered from the driver's operation of the vehicle on the multiple sequences of route segments during the multiple trips; and data, regarding multiple travel destinations, gathered from the driver's operation of the vehicle to the multiple travel destinations during the multiple trips.

REMARKS

Claims 1-17 are currently pending in the application. In the Office action, claims 1-17 stand rejected under 35 U.S.C. §102.

For the reasons set forth below, Applicant submits that each of the pending claims is in condition for allowance because each is patentably distinct from the prior art. Reconsideration of the claims and an allowance is respectfully requested.

Support for new claims 18-20 is found, among other places, in paras. [0071]-[0078], [0094]-[0100], [0134], and in other paragraphs.

Rejection of Claims 1-19 Under 35 U.S.C. §102

Claims 1-17 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Pat. No. 6,169,495 (hereinafter “Koike”). The applicant respectfully traverses these rejections, as detailed below.

Summary of the Law of Anticipation

Under post-AIA 35 U.S.C. §102, “A person shall be entitled to a patent unless—(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention; or (2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.”

As the Manual of Patent Examining Procedure (MPEP) properly indicates, “the Office bears the initial burden” of proving lack of novelty, i.e., anticipation, of a claim, and “the Office shall . . . state the reasons for such rejection.” MPEP 2152.

To anticipate a claim, the relied-upon reference must teach each and every element of the claim. “A claim is anticipated only if each and every element as set forth in the claim is found,

either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). There is an exception to the “single prior art reference” requirement when the extra references are cited to: (a) prove 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 primary reference is inherent. MPEP 2131.01.

“The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)

Although identical terminology is not requisite, the elements of the relied-upon reference must be arranged as they are arranged in the rejected claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

If a rejection relies on “official notice” and the Applicant adequately traverses it by pointing out alleged errors, including stating why the noticed fact is not well-known or common knowledge in the art, the examiner must provide documentary evidence in the next Office action if the rejection is to be maintained. See MPEP 2144.03(C), *In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001).

Arguments

Response to “Response to Arguments” on P. 6 of the Office Action

In Applicant’s last response (filed 7/2/19) it was argued that Koike does not disclose “. . . predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle.” The examiner responded in the 10/18/19 Office action, on p. 6, by stating that “col. 15, line 61 through col. 18, line 13 clearly teach and disclose the use [of] predicted course patterns in which stored historical data is used to calculate and transmit control signals to each of the individual vehicles so as to optimize vehicle speed by minimizing unnecessary accelerations and decelerations.” This is a misreading of Koike. The cited section has been reviewed in detail and, while it does discuss transmitting control signals to individual vehicles to reduce “conflicts” among vehicles, it does not disclose using any historical data to do this. The

cited section is actually quite clear that it is only using present and predicted information, not past information.

Just before the cited section, Koike at col. 13 lines 50-52 discusses that the destination can be determined based on input from the vehicle passenger or may be estimated based on “present position and speed.” Nothing is said about past position or speed. Equation (3), given at col. 13 line 56, gives the estimated speed the vehicle will take at a branch, which is either a constant (for example it could be a speed limit) or it is based on the “speed of vehicle at present time.” Col. 13, lines 61-62. Such a speed equation is used to calculate the time at which each vehicle in a given area or under system control will travel along the roads (branches) to arrive at intersections (nodes), and the system uses this to minimize “course conflicts” which are events where two vehicles will reach an intersection at about the same time and will need to cross paths. Koike Abstract, col. 14 line 35-43. The calculated speed at each branch may be modified by the system increasing the speed of all vehicles in places with large amounts of traffic (for example on a freeway) (expression/function “F”) to reduce average travel time, forcing some vehicles to wait to start travelling until there is less traffic to reduce average travel time (expression/function “G”), and/or decreasing the start time of multiple vehicles (expression/function “H”) to reduce the time to destination (waiting time plus travel time). Col. 14 lines 3-19. Notably, when Koike discusses these equations, there is no discussion of the system using any historical travel information as inputs. The equations are rather based on current vehicle positions and speeds, which are used to estimate when vehicles will, in the future, reach certain intersections. Col. 14 lines 15-34.

The system of Koike accordingly determines expected crossing times for individual vehicles with respect to individual intersections and, based on this, determines the conflicts (two vehicles crossing paths at a given intersection at around the same time) that are likely to occur. Col. 14 line 61 through col. 15 line 2 (this section also discusses varying the start time to remove conflicts). Each vehicle can accordingly be modeled by an individual equation, but the system of Koike can determine the average expected time of all vehicles by using a matrix which takes into account the equation for each vehicle and seeks to remove or reduce conflicts as much as possible when all vehicles are considered. Col. 15 lines 14-53. Because the system is minimizing conflicts and average travel time, it inherently optimizes traffic and improves energy efficiency by reducing

acceleration/deceleration (fewer conflicts inherently leads to fewer accelerations/decelerations). Col. 15 lines 56-64.

Koike is explicit that the calculation and control (or driver suggestions) for any given vehicle are made based on the “destination” and the “present position and speed” of the vehicle in question and the “destinations, present positions, and speeds of other vehicles,” not on any past or historical information. Col. 16 lines 39-60. Although the system may determine an optimal start time for vehicles that are not yet travelling, Koike says that “the start time . . . of a waiting vehicle at the present time t_1 is kept as an unknown value.” Col. 17 lines 10-11. Accordingly, Koike is not even using historical driving data to guess when a vehicle will start. Rather, for example, if a person has used an application to input a destination (for example by using a map software application to input a destination or the like), but the vehicle has not yet begun driving, the system may recommend to the driver (or for a controlled vehicle may control) a start time. But it does not use any past information to determine start times, speeds, or to otherwise control the vehicles or offer recommendations to drivers.

When one considers what Koike is trying to accomplish, it makes sense that historical data would not even be useful. Koike is trying to reduce the number of “conflicts” among hundreds or thousands (perhaps tens of thousands) of vehicles that are presently on the road in a given area, some of which are automated and some of which are driven by humans, each of which is making his/her own choices of when to leave, what route to take, whether to run any errands on the way, whether to stop for gas, and the like. Trying to eliminate conflicts based on even yesterday’s information, when the system of Koike has access to current, present information of all vehicles presently driving, makes no sense. The likelihood that a vehicle’s coordinates at a given time on one day ends up being the exact same coordinates at the exact same time on another day is remote, since so many variables affect driving from day to day. Accordingly, Koike uses much more reliable information for what it is trying to accomplish—live data reflecting the actual current situation of all vehicles. It does not need to use any historical information, and using historical information instead of present information would make the system of Koike much less reliable.

In short, the entire section cited by the examiner (which, it is pointed out, includes several pages of the reference with no further guidance), and really the entire disclosure of Koike, supports applicant’s prior argument rather than refutes it. The entire Koike reference never once uses any

of the words “history,” “historical,” or “past.” It does not in any way disclose, expressly or implicitly, gathering, storing, or using any past or historical information at all. It therefore cannot disclose, expressly or implicitly, “. . . predict[ing] a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle.” (Claims 1, 15, 16). Independent claims 1, 15, and 16 are accordingly allowable over Koike, as are the remaining claims, each of which depends from one of these independent claims.

Further arguments with respect to individual claims are given in detail below.

Independent Claim 1

In making the rejection of claim 1 the examiner argues, at p. 2, that Koike at col. 11 line 34 through col. 12 line 52 discloses “a memory configured to store said sensor data samples over a number of points in time” This is a misreading of Koike. The cited section of Koike has been reviewed in detail and it discloses no memory element at all, nor does it disclose anything about past information, only present and future information. In fact, the following words do not appear at all in the entire Koike reference (including drawings): memory; store; storage; history; past; previous; database. Any argument that Koike discloses the storing of historical information in a memory element would accordingly have to show how such a disclosure is implicit, because Koike does not explicitly disclose the storing of any past information. It is not apparent why Koike would need any historical information to be stored in order to perform its functions, because it explicitly says that its functions are based on present information (present location of a vehicle) and an estimation of future location and speed based on the present information, i.e., not based on any past information. As pointed out in the last response, col. 11 lines 34-38 state:

As shown in FIG. 2, changes in position of a vehicle from present time t_1 to future times t_2 , t_3 , t_4 , and so forth can be expressed as a broken line monotonously rising from the point indicating the present position to the point indicating the destination.

There are several other examples of Koike using “present time” information to make its calculations and/or decisions, without any reference to any past information, namely: col. 17 lines 7-11; col. 11 lines 41-46; col. 13 lines 24-29; col. 13 line 41 through col. 14 line 3; and col. 17 lines 7-11. Koike also discusses using “present location” and “present position” to perform its functions without ever referencing any past locations or past positions (see col. 18 lines 13-16; col.

19 lines 35-44; col. 20 lines 6-10; col. 20 lines 23-29; and in many other places—in fact the phrase “present position” occurs 58 times in Koike while past position is never referenced). Finally, Koike many times references using future to-be-adopted speeds to perform its functions (for example based on road speed limits) without ever referencing past speeds (see col. 4 lines 5-17; col. 6 lines 63-67).

Perhaps Koike summarizes it best by simply stating “[t]he course calculation apparatus determines the courses of vehicles including the vehicle-under-control, on the basis of detected present positions and destinations, and the speeds to be adopted on respective roads and/or tracks.” Koike, col. 4, lines 5-9. Noticeably absent from that statement is any discussion of using any past position, any past destinations, and any past speed to make course calculations.

Accordingly, since Koike does not disclose any type of memory element either in the sections cited by the examiner or elsewhere, and does not disclose the apparatus using any past data of any type in performing the functions of the system, it does not disclose, expressly or implicitly, “a memory configured to store said sensor data samples over a number of points in time.” Claim 1. The examiner has accordingly not established a case of anticipation of claim 1, or the applicant has successfully rebutted it.

In making the rejection of claim 1 the examiner further argues at p. 2 that Koike at col. 12 lines 1-60 discloses “historical data associated with operation of said vehicle.” The examiner argues that this section of Koike discloses a “state of vehicle traffic stored in matrix form as a sequence of times, t_1 , t_2 , t_3 , t_4 representing traffic congestion.” FIG. 2 of Koike discusses the times t_1 , t_2 , t_3 and t_4 . FIG. 2 is described at col. 8 lines 45-46 as “a plurality of general courses that can be taken by an arbitrary vehicle.” It is, accordingly, referring to future potential positions of a vehicle, and is therefore not “historical data associated with operation of said vehicle.” Claim 1. In Col. 12 lines 47-52 this is elaborated further. “Optimizing the traffic of vehicles can be achieved by successively selecting, from among N_c -number of combinations T_c at times t_1 , t_2 , t_3 , t_4 , and so forth, a course that allows a destination to be quickly reached without each vehicle becoming caught in traffic congestion and without frequent stopping and starting. Namely, in the present invention, a combination is selected as shown in FIG. 2, from N_c -number of combinations T_c , in which the average time required for all vehicles to reach their destinations from their present positions is shortest.” The times t_1 , t_2 , t_3 , t_4 , and so forth, are accordingly explicitly described as

being related to potential options that can be selected from for optimizing vehicle travel, i.e., potential future locations of a vehicle, not “historical data associated with operation of said vehicle.” Claim 1. Column 12, lines 5-13 state that the referenced matrix is a representation of “the state of vehicle traffic in that area in the near future” Future data is the opposite of historical data. Koike accordingly does not disclose, in the cited section or elsewhere, explicitly or implicitly, “historical data associated with operation of said vehicle.” Claim 1. The examiner has thus not established a case of anticipation of claim 1, or the applicant has successfully rebutted it.

In light of the above, it is respectfully requested that the 35 U.S.C. §102 rejection of claim 1 be withdrawn.

Dependent Claims 2-14

Dependent claims 2-14 are allowable for, among other reasons, depending from allowable claim 1. Dependent claims 4, 5, 7, 8, and 10-14 are further independently allowable for the reasons set forth below.

Dependent Claim 4

In making the rejection of claim 4 the examiner argues, at p. 3, that Koike at col. 4 lines 39-44 and col. 6 lines 28-43 disclose “wherein said destination of said driver is predicted based on statistical destination logic.” Claim 4. This is a misreading of Koike. Col. 4 lines 39-44 simply states that the destination of a vehicle can be estimated, not how it is estimated. Col. 6 lines 28-43 indicates that a “destination detection apparatus” may estimate the destination “based on movements of the vehicles” but again does not give any other information as to how the estimation is done. Accordingly, if these sections, or any others, of Koike actually disclose the relevant claim language, it would have to be disclosed implicitly, because it is not disclosed explicitly.

The examiner has made no attempt at arguing why such a disclosure is implicit in Koike. To the extent that the examiner’s arguments are an attempt at official notice that all destination estimations inherently involve statistical destination logic, the applicant requests that such official notice be made of record and that documentary evidence supporting the official notice be provided, since Koike discloses nothing about statistics, probabilities, or the like of multiple potential destinations, but only simply states that a destination is estimated. It could be as simple as estimating that the driver is heading into town (or downtown) in the morning of a workday and

heading out of town (away from downtown) in an evening of a workday, with no more granularity and without the use of any statistics. Or for example if the system area being monitored is represented by a square area and the driver is driving generally north the system may simply estimate an exit point from the square area at the center of the north perimeter of the area, and so forth. There are many ways of estimating a destination which need not involve statistical destination logic. There are thus good reasons for not reading Koike to implicitly disclose “statistical destination logic.” But, again, to the extent that the examiner’s arguments are an attempt at official notice that all destination estimation inherently involves statistical destination logic, applicant requests documentary evidence to back that up. Without documentary evidence in the next Office action, any rejection based on all destination estimation inherently including statistical destination logic cannot be maintained per MPEP 2144.03(C).

As argued above, Koike does not disclose, expressly or implicitly, “wherein said destination of said driver is predicted based on statistical destination logic.” Claim 4. The examiner has accordingly not established a case of anticipation of claim 4, or the applicant has successfully rebutted it, and it is respectfully requested that the 35 U.S.C. §102 rejection of claim 4 be withdrawn.

Dependent Claim 5

In making the rejection of claim 5 the examiner argues, at p. 3, that Koike at col. 3 lines 19-23 disclose “wherein said processor is further configured to generate a likelihood that a particular driver is operating said vehicle based on said pattern detected.” This is a misreading of Koike. The cited section states, in its entirety: “Finally, one of selected possible course patterns is selected as a course pattern. The course pattern mentioned here is a command to the vehicles or vehicle operators, and indicates a set of courses to be taken by the vehicles located within the above-mentioned area, to avoid the conflict.” Accordingly, the section cited by the examiner is referring to “course patterns” in the sense of possible combinations of courses it can instruct the vehicles to take (e.g. vehicle 1 takes road 1 at time 1, vehicle 2 takes road 2 at time 2, etc.) to avoid “conflicts” in the form of vehicles having to cross one another’s paths, such as at an intersection, at about the same time. The system tries to avoid these conflicts in order to reduce the average travel time for vehicles generally.

The referenced “pattern,” accordingly, has nothing to do with determining who the driver of any given vehicle is. The system of Koike is entirely driver agnostic—it does not care who is driving any given vehicle—nor is there any reason it would need such information or find it useful. All it cares about is whether, based on current and future positions, it is likely conflict with another vehicle. Koike does not disclose, expressly or implicitly, in the cited section or elsewhere, “wherein said processor is further configured to generate a likelihood that a particular driver is operating said vehicle based on said pattern detected.” Claim 5. The examiner has accordingly not established a case of anticipation of claim 5, or the applicant has successfully rebutted it, and it is respectfully requested that the examiner withdraw the 35 U.S.C. §102 rejection of claim 5.

Dependent Claim 7

In making the rejection of claim 7 the examiner argues, at p. 3, that Koike at col. 11 lines 6-32 discloses “wherein said pattern comprises which of said route segments said vehicle has travelled.” This is a misreading of Koike. The examiner states that this section discloses “storing route data as nodes and branches for times t1, t2, t3, t4, etc.” Koike, however, in this section is only disclosing a defined “area to be subject to traffic control” that is defined by roads or tracks being modelled as branches and intersections being modeled as nodes, as in FIG. 1. As this section explains, this is a way of representing all roads, tracks and intersections as a “two-dimensional coordinate system . . .” which is useful because then “the present position and destination of each vehicle can be expressed as coordinate values.” Col. 11 lines 13-16. Interchanges (i.e. surface streets vs. freeways vs. subways vs. train tracks, etc.) can be expressed by adding additional 2-dimensional layers to form a three dimensional coordinate system. Col. 11 lines 21-28. Thus, the cited section only describes the underlying coordinate system Koike uses to represent present and future positions of vehicles as coordinate values.

This section of Koike says nothing about a vehicle in question already having travelled along any of the routes defined in the coordinate system. When Koike discusses a “pattern,” as has been discussed above with respect to claim 5, it is discussing orders given to vehicles to tell them (or their drivers) which routes to take. It has nothing to do with historical or past driving. The patterns of Koike are in no way informed by whether any given vehicle has already travelled a given route segment. When the system of Koike commands vehicles to travel a certain pattern it has no interest in which routes those vehicles have travelled before, but is only interested in

minimizing “conflicts” to reduce average travel time for all vehicles in the present. Koike, Abstract. The examiner is also referred to the above Response to Arguments section which establishes that the invention of Koike does not gather, store, or use any past or historical information at all—it does not need to because it has access to live data which is much more accurate and useful for its specific purposes. Koike accordingly does not disclose, in the cited section or elsewhere, “wherein said pattern comprises which of said route segments said vehicle has traveled.” Claim 7. The examiner has thus not established a case of anticipation of claim 7, or the applicant has successfully rebutted it, and it is respectfully requested that the examiner withdraw the 35 U.S.C. §102 rejection of claim 7.

Dependent Claim 8

In making the rejection of claim 8 the examiner argues, at p. 4 of the Office action, that Koike at col. 12 lines 24-52 discloses “wherein said apparatus is further configured to transmit said predicted destination to a remote database.” This is a misreading of Koike. While this section of Koike does disclose a matrix which expresses a combination of possible courses for vehicles to take, to optimize traffic from among Nc number of combinations, this does not require an “apparatus . . . configured to transmit said predicted destination to a remote database.” Claim 8. There is nothing in this section of Koike that describes a database as being needed. It is entirely possible the system of Koike, since it is processing this information in real time as vehicles are currently travelling, processes the respective algorithms without ever storing predicted destinations in a database. The entire disclosure of Koike never once uses the terms “database,” “data base,” “memory,” “store,” “storage,” or “record.” It is therefore not explicit that any database is even needed. Additionally, the cited section discloses nothing remotely related to an apparatus making such destination estimations and then communicating them to a remote location.

The examiner has made no attempt at arguing why such a disclosure is implicit in Koike. To the extent that the examiner’s arguments are an attempt at official notice that any system making use of one or more matrices for mathematical calculations must inherently use a database, the applicant requests that such official notice be made of record and that documentary evidence supporting the official notice be provided, since Koike discloses nothing about a database, and since a common graphing calculator makes use of matrices for mathematical calculations without any use of a database. Without documentary evidence in the next Office action, any rejection based

on all matrix-related algorithms inherently requiring a database cannot be maintained per MPEP 2144.03(C).

As argued above, Koike does not disclose, expressly or implicitly, “wherein said apparatus is further configured to transmit said predicted destination to a remote database.” Claim 8. The examiner has accordingly not established a case of anticipation of claim 8, or the applicant has successfully rebutted it, and it is respectfully requested that the 35 U.S.C. §102 rejection of claim 8 be withdrawn.

Dependent Claim 10

In making the rejection of claim 10 the examiner argues, at p. 4, that Koike at col. 12 lines 24-52 discloses “wherein said remote database is configured to (i) receive said sensor data samples and store said sensor data samples as said historical data and (ii) present said historical data to said apparatus.” This is a misreading of Koike. As established above with respect to claim 8, specifically with regards to Koike col. 12 lines 24-52, Koike does not even disclose, expressly or implicitly, a database. Because Koike does not even disclose a database, it cannot possibly disclose “said remote database is configured to (i) receive said sensor data samples and store said sensor data samples as said historical data and (ii) present said historical data to said apparatus.” Claim 10. Furthermore, as established above with in the Response to Arguments section, and as established above with respect to claims 1 and 7, Koike does not even disclose, expressly or implicitly, gathering or storing any historical data at all. The cited section of col. 12 lines 24-52 only discusses a matrix expressing possible future courses for vehicles (which are called “possible courses”), not past courses (Col. 12, lines 24-52), nor does this section or any other section of Koike discuss gathering, storing, or using any past or historical information at all. The invention of Koike does not need historical data to perform its functions, because it has live data, which is much more accurate for its specific purposes of avoiding conflict of vehicles currently driving. Using historical data, instead of the live data that is has access to, would increase the number of vehicle conflicts instead of decreasing them, frustrating the goal of Koike. Koike, Abstract. Because Koike does not even disclose gathering, storing, or using historical information at all, it cannot possibly disclose “wherein said remote database is configured to . . . store said sensor data samples as said historical data and (ii) present said historical data to said apparatus.” Claim 10. The examiner has accordingly not established a case of anticipation of claim 10, or the application

has successfully rebutted it, and it is respectfully requested that the examiner withdraw the 35 U.S.C. §102 rejection of claim 10.

Dependent Claim 11

In making the rejection of claim 11 the examiner argues, at p. 4, that Koike at col. 11 lines 8-12 and col. 12 lines 5-39 discloses “wherein said memory is further configured to store said historical data.” This is a misreading of Koike. As established above in the Response to Arguments section, and as established with respect to claim 1, Koike does not even disclose a memory element at all, nor does it disclose any gathering, storing, or use of any historical or past data. Koike at col. 11 lines 8-12 only discusses the defining of roads, tracks, etc. using a two-dimensional or three-dimensional framework so that vehicle locations can be defined using a coordinate system, as has been discussed above with respect to claim 7. It has nothing to do with “historical data associated with operation of a vehicle” (claim 1), which is the “historical data” referenced in claim 11. Koike at col. 12 lines 5-39 only discusses a matrix which uses algorithms to minimize vehicle conflicts based on possible future locations of vehicles, as discussed above with respect to claim 1, and has nothing to do with any past or historical information. Koike accordingly does not disclose a memory element at all, nor any historical data with regards to a vehicle. It accordingly cannot disclose “wherein said memory is further configured to store said historical data.” Claim 11. The examiner has thus not established a case of anticipation of claim 11, or the applicant has successfully rebutted it, and it is respectfully requested that the 35 U.S.C. §102 rejection of claim 11 be withdrawn.

Dependent Claim 12

In making the rejection of claim 12 the examiner argues, at p. 4, that Koike at col. 13 lines 41-65 discloses “wherein said historical data comprises route segments traveled, a sequence of route segments traveled and travel destinations.” This is a misreading of Koike. As established above in the Response to Arguments section and as established with respect to claims 1 and 7, Koike does not disclose gathering, storing, or using historical information about a vehicle at all. Furthermore, as established with respect to claim 7, while Koike defines two-dimensional and three-dimensional systems for defining vehicle locations using a coordinate system, the coordinates always represent present or future locations, never segments already traveled by a

vehicle. Koike col. 13 lines 41-65 only discusses using “present position, destination,” “vehicle speed” and a travel start time—all present data or future estimates—to perform its calculations. It does not disclose using any past, stored, or historical vehicle information to make the calculations. Koike accordingly does not disclose, expressly or implicitly, in the cited section or elsewhere, “wherein said historical data comprises route segments traveled, a sequence of route segments traveled and travel destinations.” Claim 12. The examiner has accordingly not established a case of anticipation of claim 12, or the applicant has successfully rebutted it, and it is respectfully requested that the examiner withdraw the 35 U.S.C. §102 rejection of claim 12.

Dependent Claim 13

In making the rejection of claim 13 the examiner argues, at p. 4, that Koike at col. 13 lines 41-65 discloses “wherein said historical data comprises information about operation of said vehicle.” This is a misreading of Koike. As established above in the Response to Arguments section and as established with respect to claims 1 and 7, Koike does not disclose gathering, storing, or using historical information about a vehicle at all. Furthermore, as established with respect to claim 7, while Koike defines two-dimensional and three-dimensional systems for defining vehicle locations using a coordinate system, these refer always to present or future travels of a vehicle, never segments already traveled by a vehicle. Koike col. 13 lines 41-65 only discusses using “present position, destination,” “vehicle speed” and a travel start time—all present or future occurrences—to perform its calculations. It does not disclose using any past, stored, or historical vehicle information to make the calculations. Koike accordingly does not disclose, expressly or implicitly, in the cited section or elsewhere, “wherein said historical data comprises information about operation of said vehicle.” Claim 13. The examiner has accordingly not established a case of anticipation of claim 13, or the applicant has successfully rebutted it, and it is respectfully requested that the examiner withdraw the 35 U.S.C. §102 rejection of claim 13.

Dependent Claim 14

In making the rejection of claim 14 the examiner argues, at p. 4-5, that Koike at col. 1 lines 30-50 discloses “wherein at least one of said sensor data samples comprises a data sample from an optical sensor.” This is a misreading of Koike. While Koike in this section discusses driverless vehicles, it discusses nothing with regards to any particular sensors or sensor types of the driverless

vehicles. Driverless vehicles could be controlled without using input from optical sensors. For example driverless vehicles could instead use inputs such as: GPS location of the vehicle itself; GPS locations of other vehicles as communicated through radio communications or the like (generally not considered “optics”); GPS locations of pedestrian smart phones and the like communicated through radio communications or the like (generally not considered “optics”); positions of obstacles, pedestrians, etc. as sensed using acoustics (e.g., ultrasonic sensors such as those already in use to prevent collisions while backing up a vehicle); and the like. Koike accordingly does not disclose, expressly or implicitly, anything related to optical sensors.

The examiner has made no attempt at arguing that Koike implicitly discloses optical sensors. To the extent that the examiner’s arguments are an attempt at official notice that all driverless vehicles inherently involve optical sensors, the applicant requests that such official notice be made of record and that documentary evidence supporting the official notice be provided, since the above methods and non-optical sensor types and could in implementations be used to guide driverless vehicles without the use of optical sensors. Without documentary evidence in the next Office action, any rejection based on all driverless vehicles inherently including optical sensors cannot be maintained per MPEP 2144.03(C).

As argued above, Koike does not disclose, expressly or implicitly, “wherein at least one of said sensor data samples comprises a data sample from an optical sensor.” Claim 14. The examiner has accordingly not established a case of anticipation of claim 14, or the applicant has successfully rebutted it, and it is respectfully requested that the 35 U.S.C. §102 rejection of claim 14 be withdrawn.

Independent Claim 15

In making the rejection of claim 15 the examiner argues, at p. 5, that Koike at col. 11 line 34 through col. 12 line 52 discloses “storing said sensor data samples over a number of points in time.” This is a misreading of Koike. The examiner is referred to the arguments made above with respect to claim 1, which establish that the cited section of Koike does not disclose “a memory configured to store said data samples over a number of points in time.” For the same or similar reasons as those discussed above with respect to claim 1, this section of Koike does not disclose, expressly or implicitly, “storing said sensor data samples over a number of points in time.” Claim

15. The examiner has accordingly not established a case of anticipation of claim 15, or the applicant has successfully rebutted it.

In making the rejection of claim 15 the examiner also argues, at p. 5, that Koike at col. 11 lines 6-32 discloses “analyzing said sensor data samples to detect a pattern.” This is a misreading of Koike. As described above with respect to claim 7, the cited section of Koike discloses creating a defined “area to be subject to traffic control” that is defined by roads or tracks being modelled as branches and intersections being modeled as nodes, as in FIG. 1. As this section explains, this is a way of representing all roads, tracks and intersections as a “two-dimensional coordinate system . . .” which is useful because then “the present position and destination of each vehicle can be expressed as coordinate values.” Col. 11 lines 13-16. Interchanges (i.e. surface streets vs. freeways vs. subways vs. train tracks, etc.) can be expressed by adding additional 2-dimensional layers to form a three dimensional coordinate system. Col. 11 lines 21-28. Thus, the cited section only describes the underlying coordinate system Koike uses to represent present and future positions of vehicles as coordinate values.

This section of Koike says nothing about using any sensor data samples to “detect” any pattern. When Koike discusses a “pattern,” as has been discussed above with respect to claim 5, it is discussing orders given to vehicles to tell them (or their drivers) which routes to take. The pattern is accordingly mandated by the system of Koike to the vehicles, it is not “detected” using sensor data samples. There is nothing in Koike about a pattern that is “detected,” and sensor data samples are not used to generate or alter the underlying coordinate system. Col. 11 lines 6-32. Koike accordingly does not disclose, in the cited section or elsewhere, “analyzing said sensor data samples to detect a pattern.” Claim 15. The examiner has thus not established a case of anticipation of claim 15, or the applicant has successfully rebutted it.

In making the rejection of claim 15 the examiner further argues, at p. 5, that Koike at col. 6 lines 28-43 and col. 12 lines 1-60 discloses “predicting a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle.” This is a misreading of Koike. As established immediately above, the referenced “pattern” of Koike is not detected, but is mandated by the system to the vehicles. The “said pattern” of claim 15 is the detected pattern previously presented in the same claim. Because the examiner has not established that Koike discloses any “detected” pattern, the examiner has not established that Koike discloses,

expressly or implicitly, “predicting a destination of a driver in response to (a) said pattern.” Claim 15. Additionally, as has been established above with respect to claim 1, Koike does not disclose, expressly or implicitly, “a processor configured to . . . predict a destination of a driver in response to . . . historical data associated with operation of said vehicle.” Claim 1. For the same or similar reasons, Koike does not disclose, expressly or implicitly, “predicting a destination of a driver in response to . . . historical data associated with operation of said vehicle.” Claim 15. For these reasons, Koike does not disclose, expressly or implicitly, “predicting a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle.” The examiner has accordingly not established a case of anticipation of claim 15, or the applicant has successfully rebutted it.

In light of the above, it is respectfully requested that the 35 U.S.C. §102 rejection of claim 15 be withdrawn.

Independent Claim 16

In making the rejection of claim 16 the examiner argues, at p. 5, that Koike at col. 11 line 34 through col. 12 line 52 discloses “a storage device configured to store sensor data samples over a number of points in time. This is a misreading of Koike. As established above with respect to claim 1, Koike does not disclose, expressly or implicitly, “a memory configured to store said sensor data samples over a number of points in time.” Claim 1. For the same or similar reasons Koike does not disclose, expressly or implicitly, “a storage device configured to store said sensor data samples over a number of points in time.” Claim 16. The examiner has accordingly not made a case of anticipation of claim 16, or the applicant has successfully rebutted it.

In making the rejection of claim 16 the examiner also argues, at p. 5-6, that Koike at col. 11 lines 6-32 discloses “a processing device configured to (i) analyze said sensor data samples stored in said storage device to detect a pattern.” This is a misreading of Koike. As described above with respect to claim 7, the cited section of Koike discloses creating a defined “area to be subject to traffic control” that is defined by roads or tracks being modelled as branches and intersections being modeled as nodes, as in FIG. 1. As this section explains, this is a way of representing all roads, tracks and intersections as a “two-dimensional coordinate system . . .” which is useful because then “the present position and destination of each vehicle can be expressed as coordinate

values.” Col. 11 lines 13-16. Interchanges (i.e. surface streets vs. freeways vs. subways vs. train tracks, etc.) can be expressed by adding additional 2-dimensional layers to form a three dimensional coordinate system. Col. 11 lines 21-28. Thus, the cited section only describes the underlying coordinate system Koike uses to represent present and future positions of vehicles as coordinate values.

This section of Koike says nothing about using any sensor data samples to “detect” any pattern. When Koike discusses a “pattern,” as has been discussed above with respect to claim 5, it is discussing orders given to vehicles to tell them (or their drivers) which routes to take. The pattern is accordingly mandated by the system of Koike to the vehicles, it is not “detected” using sensor data samples. There is nothing in Koike about a pattern that is “detected.” Nor are any sensor data samples used to provide the underlying coordinate system that is discussed in the cited section of col. 11 lines 6-32. Koike accordingly does not disclose, in the cited section or elsewhere, “a processing device configured to (i) analyze said sensor data samples stored in said storage device to detect a pattern.” Claim 16. The examiner has thus not established a case of anticipation of claim 16, or the applicant has successfully rebutted it.

In making the rejection of claim 16 the examiner further argues, at p. 6, that Koike at col. 6 lines 28-43 and col. 12 lines 1-60 discloses “a processing device configured to . . . (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle.” This is a misreading of Koike. As established immediately above, the referenced “pattern” of Koike is not detected, but is mandated by the system to the vehicles. The “said pattern” of claim 16 is the detected pattern previously presented in the same claim. Because the examiner has not established that Koike discloses any “detected” pattern, the examiner has not established that Koike discloses, expressly or implicitly, “a processing device configured to . . . (ii) predict a destination of a driver in response to (a) said pattern.” Claim 16. Additionally, as has been established above with respect to claim 1, Koike does not disclose, expressly or implicitly, “a processor configured to . . . predict a destination of a driver in response to . . . historical data associated with operation of said vehicle.” Claim 1. For the same or similar reasons, Koike does not disclose, expressly or implicitly, “a processing device configured to . . . (ii) predict a destination of a driver in response to . . . (b) historical data associated with operation of said vehicle.” Claim 16. For these reasons, Koike does not disclose, expressly or implicitly, “a processing device

configured to . . . (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle.” The examiner has accordingly not made a case of anticipation of claim 16, or the applicant has successfully rebutted it.

In light of the above, it is respectfully requested that the 35 U.S.C. §102 rejection of claim 16 be withdrawn.

Dependent Claim 17

Dependent claim 17 is allowable for, among other reasons, depending from allowable claim 16.

Conclusion

In light of the above, it is respectfully requested that the 35 U.S.C. §102 rejections of claims 1-17 be withdrawn.

CONCLUSION

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the examiner. Should the examiner believe that a telephone conference would expedite the prosecution of this application; the undersigned can be reached at the telephone number set out below.

The Commissioner is authorized to charge any additional fees to process this Amendment, or credit any over-payments that may apply, to our Deposit Account No. 50-2421.

Respectfully submitted

Dated: 01/21/2020

____/David R. Stevens/ ____
David R. Stevens
Reg. No. 38,626

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1754 Technology Dr., Ste. 226
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Electronic Acknowledgement Receipt	
EFS ID:	38357722
Application Number:	15698977
International Application Number:	
Confirmation Number:	5976
Title of Invention:	VEHICLE DESTINATION PREDICTION
First Named Inventor/Applicant Name:	Martin Koebler
Customer Number:	141471
Filer:	David R. Stevens/Annette Tri
Filer Authorized By:	David R. Stevens
Attorney Docket Number:	INVN-00112
Receipt Date:	21-JAN-2020
Filing Date:	08-SEP-2017
Time Stamp:	18:24:30
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response.pdf	206952	yes	25
			48b83f57ff1aab7e5af69db972efa36f44e0873		

Multipart Description/PDF files in .zip description		
Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	6
Applicant Arguments/Remarks Made in an Amendment	7	25

Warnings:

Information:

Total Files Size (in bytes):	206952
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15698977		Filing Date		☐ To be Mailed	
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO									
APPLICATION AS FILED - PART I									
FOR		(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A	N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A	N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A	N/A					
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =	*	x \$40 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*	x \$210 =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL					
APPLICATION AS AMENDED - PART II									
AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(j))	* 20	Minus	** 20	= -	x \$0 =			
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= -	x \$0 =			
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(j))	*	Minus	**	=	x \$0 =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$0 =			
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						UMP/LIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/RICARDO CAMOU/			
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".									
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Doc Code: ECOMM.AUTH/ECOMM.WTDW

Doc Description: Internet Communications Authorized/Internet Communications Authorization Withdrawn

PTO/SB/439 (11-15)

**AUTHORIZATION FOR INTERNET
COMMUNICATIONS IN A PATENT
APPLICATION OR REQUEST TO
WITHDRAW AUTHORIZATION FOR
INTERNET COMMUNICATIONS**

Application No.	15/698,977
Filing Date	09-08-2017
First Named Inventor	Martin Koebler
Art Unit	3663
Examiner Name	PIPALA, EDWARD J
Practitioner Docket No.	INVN-00112

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I. To authorize permission for Internet Communications.

☒ Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned and practitioners in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via video conferencing, instant messaging, or electronic mail. I understand that a copy of these communications will be made of record in the application file. (MPEP 502.03)

II. To withdraw authorization for Internet Communications.

☐ The authorization given on _____, to the USPTO to communicate with the undersigned and any practitioner in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via Internet communications such as video conferencing, instant messaging, or electronic mail is hereby withdrawn. I understand that the withdrawal is effective when approved rather than when received.

I am the

☐ applicant.

☒ attorney or agent of record. Registration number 38626.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/David R. Stevens/
Signature

11/08/2019
Date

David R. Stevens
Typed or printed name

408-288-7588
Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Juristic entities must be represented by a patent practitioner (see 37 CFR 1.31, which is applicable to any paper filed on or after September 16, 2012, that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below*.

☒ * Total of 1 forms are submitted.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	37697572
Application Number:	15698977
International Application Number:	
Confirmation Number:	5976
Title of Invention:	VEHICLE DESTINATION PREDICTION
First Named Inventor/Applicant Name:	Martin Koebler
Customer Number:	141471
Filer:	David R. Stevens/TRAM RICHARDS
Filer Authorized By:	David R. Stevens
Attorney Docket Number:	INVN-00112
Receipt Date:	08-NOV-2019
Filing Date:	08-SEP-2017
Time Stamp:	12:49:32
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Internet Communications Authorized	Authorization_for_Internet_Comm.pdf	80768 6c4ba4cf74feb997493bcdf8c03f34f09e9f4c	no	2
Warnings:					

Information:	
Total Files Size (in bytes):	80768
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.	



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/698,977	09/08/2017	Martin Koebler	INVN-00112	5976
141471	7590	10/18/2019		
Stevens Law Group - Invently Automotive 1754 Technology Drive Suite 226 San Jose, CA 95110			EXAMINER PIPALA, EDWARD J	
			ART UNIT	PAPER NUMBER
			3663	
			NOTIFICATION DATE	DELIVERY MODE
			10/18/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gmathis@inventlyauto.com
uspto@stevenslawgroup.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

This Office action is in response to Applicant's Arguments and remarks of 07/02/19.

Claims 1-17 are presently pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 -17 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Koike (US Pat. 6,169,495).

With respect to independent claim 1, reciting an apparatus comprising:

a sensor interface configured to receive sensor data samples during operation of a vehicle (figures 13,14,16 wrt interface 62);

a memory configured to store said sensor data samples over a number of points in time (col. 11, line 34 through col. 12, line 52 wrt changes in vehicle position with points in time); and

a processor configured to (i) analyze said sensor data samples stored in said memory to detect a pattern (col. 11, lines 6-32 wrt nodes and branches stored with road information such as slope), pattern and (ii) predict a destination of a driver (col. 6, lines 28-43 wrt estimation of moments of vehicles) in response to (a) said pattern and (b) historical data associated with operation of said vehicle (col. 12, lines 1-60 wrt state of vehicle traffic stored in matrix form as a sequence of times, t1, t2, t3, t4 representing traffic congestion), wherein (i) at least one of said sensor data samples is driver-related

and (ii) at least one of said sensor data samples comprises telemetry data (col. 11, lines 34-57 wrt changes in position of the vehicle and traffic or road congestion with time).

With respect to claim 2, wherein said telemetry data comprises map coordinates determined in response to a GPS signal (col. 3, line 61 through col. 4, line 4 wrt a position detection apparatus installed in vehicles).

With respect to claim 3, wherein said telemetry data comprises map coordinates determined by a map service (col. 1, lines 51 -55 and col. 3, lines 2-13 wrt vehicle traffic control implemented in an area).

With respect to claim 4, wherein said destination of said driver is predicted based on statistical destination logic (col. 4, lines 39-44 and col. 6, lines 28-43 wrt estimation of vehicle movement and destination).

With respect to claim 5, wherein said processor is further configured to generate a likelihood that a particular driver is operating said vehicle based on said pattern detected (col. 3, lines 19-23 wrt a course pattern taken by vehicles or operators).

With respect to claim 6, wherein said telemetry data is used to determine route segments (col. 5, lines 44-59 wrt controller-vehicle communication channel and col. 6, lines 28-43 wrt estimation of vehicle movements).

With respect to claim 7, wherein said pattern comprises which of said route segments said vehicle has traveled (col. 11, lines 6-32 wrt storing route data as nodes and branches for times t1, t2, t3, t4, etc).

With respect to claim 8, wherein said apparatus is further configured to transmit said predicted destination to a remote database (col. 12, lines 24-52 wrt vehicle possible courses and optimizing traffic from among N-number of combinations).

With respect to claim 9, wherein said remote database is configured to receive a plurality of said predicted destinations and generate guidance information based on said plurality of said predicted destinations (col. 12, lines 24-52 wrt vehicle possible courses and optimizing traffic from among N-number of combinations).

With respect to claim 10, wherein said remote database is configured to (i) receive said sensor data samples and store said sensor data samples as said historical data and (ii) present said historical data to said apparatus (col. 12, lines 24-52 wrt vehicle possible courses and optimizing traffic from among N-number of combinations).

With respect to claim 11, wherein said memory is further configured to store said historical data (col. 11, lines 8-12 wrt storing a plurality of intersections as nodes and branches and col. 12, lines 5-39 wrt a multi-dimensional vehicle intersection state matrix).

With respect to claim 12, wherein said historical data comprises route segments traveled, a sequence of route segments traveled and travel destinations (col. 13, lines 41 -65 wrt the state vector matrix and estimating destination on the basis of present position and speed).

With respect to claim 13, wherein said historical data comprises information about operation of said vehicle (col. 13, lines 41-65 wrt the state vector matrix and estimating destination on the basis of present position and speed).

With respect to claim 14, wherein at least one of said sensor data samples comprises a data

sample from an optical sensor (col. 1, lines 30-50 wrt driverless vehicles).

With respect to independent claim 15, reciting a method for predicting a destination of a vehicle, comprising the steps of:

- (A) monitoring a plurality of sensors to generate sensor data samples during operation of a vehicle (figures 13,14,16 wrt interface 62)3;
- (B) storing said sensor data samples over a number of points in time (col. 11, line 34 through col. 12, line 52 wrt changes in vehicle position with points in time);
- (C) analyzing said sensor data samples to detect a pattern (col. 11, lines 6-32 wrt nodes and branches stored with road information such as slope); and
- (D) predicting a destination of a driver (col. 6, lines 28-43 wrt estimation of moments of vehicles) in response to (a) said pattern and (b) historical data associated with operation of said vehicle (col. 12, lines 1-60 wrt state of vehicle traffic stored in matrix form as a sequence of times, t1, t2, t3, t4 representing traffic congestion), wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data (col. 11, lines 34-57 wrt changes in position of the vehicle and traffic or road congestion with time).

With respect to independent claim 16, reciting a vehicle comprising:

- a power train (col. 17, lines 41 -45 wrt vehicle controller and drivetrain);
- a drive train (col. 17, lines 41 -45 wrt vehicle controller and drivetrain);
- a sensor interface configured to receive sensor data samples during operation of a vehicle (figures 13,14,16 wrt interface 62);
- a storage device configured to store said sensor data samples over a number of points in time (col. 11, line 34 through col. 12, line 52 wrt changes in vehicle position with points in time); and
- a processing device configured to (i) analyze said sensor data samples stored in said storage device to detect a pattern (col. 11, lines 6-32 wrt nodes and branches stored with road information such

as slope) and (ii) predict a destination of a driver (col. 6, lines 28-43 wrt estimation of moments of vehicles) in response to (a) said pattern and (b) historical data associated with operation of said vehicle (col. 12, lines 1-60 wrt state of vehicle traffic stored in matrix form as a sequence of times, t_1 , t_2 , t_3 , t_4 representing traffic congestion), wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data. (col. 11, lines 34-57 wrt changes in position of the vehicle and traffic or road congestion with time).

With respect to claim 17, further comprising:

an apparatus configured to (i) receive said predicted destination and (ii) adapt an operation of said vehicle based on said predicted destination (please see figures 8-11 and 13-21 wrt communications and course matrix generator and vehicle controller of figure 10 in particular).

Response to Arguments

Applicant's arguments filed on 07/02/19 with respect to the previous rejection of claims 1-17 under 35 U.S.C. 102(b) as being anticipated by Koike in the Office action of 01/02/19 have been fully considered but they are not seen to be persuasive, in that while Applicant appears to argue that Koike does not provide for predicting a destination for a driver based on a pattern of historical data, where col. 15, line 61 through col. 18, line 13 clearly teach and disclose the use predicted course patterns in which stored historical data is used to calculate and transmit control signals to each of the individual vehicles so as to optimize vehicle speed by minimizing unnecessary accelerations and decelerations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD J. PIPALA whose telephone number is (571)272-1360. The examiner can normally be reached on M-F generally 8 am - 6 pm (Eastern).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571) 272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EDWARD J PIPALA/
Examiner, Art Unit 3663

<i>Search Notes</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner EDWARD J PIPALA	Art Unit 3663

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
B60K 2350/1056, 1092, 1076	12/26/2018	ejp
B60K35/00	12/26/2018	ejp
B60W 30/00, 095	12/26/2018	ejp
B60W 40/00, 02, 04, 06, 072, 09	12/26/2018	ejp
B60W 2520/00, 14, 145	12/26/2018	ejp
B60W 2540/00, 12, 18, 20, 28, 30	12/26/2018	ejp
B60W 2550/00, 13, 14, 141, 142, 143, 145, 146	12/26/2018	ejp
B60W 30/00, 095	10/13/2019	ejp
B60W 40/00, 02, 04, 06, 072, 09	10/13/2019	ejp
B60W 2520/00, 14, 145	10/13/2019	ejp
B60W 2540/00, 12, 18, 20, 28, 30	10/13/2019	ejp
B60W 2550/00, 13, 14, 141, 142, 143, 145, 146	10/13/2019	ejp

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

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<i>Search Notes</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner EDWARD J PIPALA	Art Unit 3663

Search Notes		
Search Notes	Date	Examiner
Reviewed PLUS results	12/26/2018	ejp
EAST text and image search (CPC sets searched in part)	12/26/2018	ejp
Updated EAST search results	10/13/2019	ejp

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named

Inventor: Martin Koebler

Art Unit: 3663

Serial No: 15/698,977

Examiner: Edward J. Pipala

Filed: September 8, 2017

Title: VEHICLE DESTINATION PREDICTION

* * *

RESPONSE

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In response to the non-final Office action mailed January 2, 2019 in connection with the above-referenced patent application, Applicant respectfully requests reconsideration in view of the following remarks.

IN THE CLAIMS

Please amend the claims as follows:

1. (original) An apparatus comprising:

a sensor interface configured to receive sensor data samples during operation of a vehicle;

a memory configured to store said sensor data samples over a number of points in time;

and

a processor configured to (i) analyze said sensor data samples stored in said memory to detect a pattern and (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data.
2. (original) The apparatus according to claim 1, wherein said telemetry data comprises map coordinates determined in response to a GPS signal.
3. (original) The apparatus according to claim 1, wherein said telemetry data comprises map coordinates determined by a map service.
4. (original) The apparatus according to claim 1, wherein said destination of said driver is predicted based on statistical destination logic.

5. (original) The apparatus according to claim 1, wherein said processor is further configured to generate a likelihood that a particular driver is operating said vehicle based on said pattern detected.

6. (original) The apparatus according to claim 1, wherein said telemetry data is used to determine route segments.

7. (original) The apparatus according to claim 6, wherein said pattern comprises which of said route segments said vehicle has traveled.

8. (original) The apparatus according to claim 1, wherein said apparatus is further configured to transmit said predicted destination to a remote database.

9. (original) The apparatus according to claim 8, wherein said remote database is configured to receive a plurality of said predicted destinations and generate guidance information based on said plurality of said predicted destinations.

10. (original) The apparatus according to claim 8, wherein said remote database is configured to (i) receive said sensor data samples and store said sensor data samples as said historical data and (ii) present said historical data to said apparatus.

11. (original) The apparatus according to claim 1, wherein said memory is further configured to store said historical data.

12. (original) The apparatus according to claim 1, wherein said historical data comprises route segments traveled, a sequence of route segments traveled and travel destinations.

13. (original) The apparatus according to claim 1, wherein said historical data comprises information about operation of said vehicle.

14. (original) The apparatus according to claim 1, wherein at least one of said sensor data samples comprises a data sample from an optical sensor.

15. (original) A method for predicting a destination of a vehicle, comprising the steps of:

- (A) monitoring a plurality of sensors to generate sensor data samples during operation of a vehicle;
- (B) storing said sensor data samples over a number of points in time;
- (C) analyzing said sensor data samples to detect a pattern; and
- (D) predicting a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data.

16. (original) A vehicle comprising:

- a power train;
- a drive train;
- a sensor interface configured to receive sensor data samples during operation of a vehicle;
- a storage device configured to store said sensor data samples over a number of points in time; and
- a processing device configured to (i) analyze said sensor data samples stored in said storage device to detect a pattern and (ii) predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle, wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data.

17. (original) The vehicle according to claim 16, further comprising: an apparatus configured to (i) receive said predicted destination and (ii) adapt an operation of said vehicle based on said predicted destination.

REMARKS

Claims 1-17 are currently pending in the application. In the Office action, claims 1-17 stand rejected under 35 U.S.C. §102.

For the reasons set forth below, Applicant submits that each of the pending claims is in condition for allowance because each is patentably distinct from the prior art. Reconsideration of the claims and an allowance is respectfully requested.

Rejection of Claims 1-19 Under 35 U.S.C. §102

Claims 1-17 stand rejected under 35 U.S.C. §102(b) as being anticipated by Koike. However, “[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” MPEP §2131. Applicant does not find in Koike each and every element of claims 1-17. Accordingly, Applicant asserts that the anticipation rejection based on Koike should be withdrawn.

Claim 1 stands rejected as being allegedly anticipated by Koike. However, claim 1 in the present disclosure includes the limitation “... predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle.” Applicant respectfully asserts that Koike does not teach enabling historical data associated with operation of a vehicle. Specifically, the present Office Action cites col. 12, lines 1-60 as being equivalent to historical data. However, col. 11, lines 34 through 38 in Koike explicitly state:

As shown in FIG. 2, changes in position of a vehicle from present time t_1 to future times t_2 , t_3 , t_4 , and so forth can be expressed as a broken line monotonously rising from the point indicating the present position to the point indicating the destination.

Similarly, Col. 12, lines 1-60 reference only present and future times, and not historical data from past time instances. In other words, Koike teaches about using only present and future

time intervals to implement the invention, and does not teach using or storing historical (past) route information. Information about historical information can be found in the current specification on page 40, lines 4-22, and on page 41. Koike essentially teaches a vehicle control method that uses present and future time references, and not historical data, to control a vehicle. Claim 1 is, therefore, allowable over Koike.

Claims 2-6 stand rejected as being allegedly anticipated by Koike. Claims 2-6 depend from claim 1, which is allowable over Koike for reasons described above; hence, claims 2-6 are allowable over Koike for at least the reasons described above.

Claim 7 stands rejected as being allegedly anticipated by Koike. Claim 7 depends from claim 6, which is allowable over Koike for reasons described above; hence claim 6 is allowable over Koike for at least the reasons described above. anticipated by Koike.

Claim 8 stands rejected as being allegedly anticipated by Koike. Claim 8 depends from claim 1, which is allowable over Koike for reasons described above; hence, claim 8 is allowable over Koike for at least the reasons described above.

Claims 9 and 10 stand rejected as being allegedly anticipated by Koike. Claims 9 and 10 depend from claim 8, which is allowable over Koike for reasons described above; hence claims 9 and 10 are allowable over Koike for at least the reasons described above.

Claims 11-14 stand rejected as being allegedly anticipated by Koike. Claims 11-14 depend from claim 1, which is allowable over Koike for reasons described above; hence, claims 11-14 are allowable over Koike for at least the reasons described above.

Independent claim 15 has been rejected as being allegedly anticipated by Koike, for reasons similar to those described for claim 1. By the discussion presented above for claim 1,

Applicant respectfully asserts that claim 15 is allowable over Koike for at least the reasons described above for claim 1.

Independent claim 16 has been rejected as being allegedly anticipated by Koike. Claim 16 includes the limitation "... predict a destination of a driver in response to (a) said pattern and (b) historical data associated with operation of said vehicle" that is not taught by Koike. By the discussion presented above for claim 1, Applicant respectfully asserts that claim 16 is allowable over Koike for at least the reasons described above for claim 1.

Claim 17 stands rejected as being allegedly anticipated by Koike. Claim 17 depends from claim 16, which is allowable over Koike for reasons described above; hence, claim 17 is allowable over Koike for at least the reasons described above.

CONCLUSION

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application; the undersigned can be reached at the telephone number set out below.

The Commissioner is authorized to charge any additional fees to process this Amendment, or credit any over-payments that may apply, to our Deposit Account No. 50-2421.

Respectfully submitted

Dated: July 2, 2019

____/ David R. Stevens/____
David R. Stevens
Reg. No. 38,626

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Electronic Patent Application Fee Transmittal				
Application Number:		15698977		
Filing Date:		08-Sep-2017		
Title of Invention:		VEHICLE DESTINATION PREDICTION		
First Named Inventor/Applicant Name:		Martin Koebler		
Filer:		David R. Stevens/TRAM RICHARDS		
Attorney Docket Number:		INVN-00112		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension - 3 months with \$0 paid	2253	1	700	700
Miscellaneous:				
Total in USD (\$)				700

Electronic Acknowledgement Receipt	
EFS ID:	36477747
Application Number:	15698977
International Application Number:	
Confirmation Number:	5976
Title of Invention:	VEHICLE DESTINATION PREDICTION
First Named Inventor/Applicant Name:	Martin Koebler
Customer Number:	141471
Filer:	David R. Stevens/TRAM RICHARDS
Filer Authorized By:	David R. Stevens
Attorney Docket Number:	INVN-00112
Receipt Date:	02-JUL-2019
Filing Date:	08-SEP-2017
Time Stamp:	13:56:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$700
RAM confirmation Number	070319INTEFSW00000199502421
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Response.pdf	103117	yes	9
			a2fd77ab56ef000919ba73fb108f3b9db12c231a		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Req. Reconsideration-After Non-Final Reject		1	1	
	Claims		2	5	
	Applicant Arguments/Remarks Made in an Amendment		6	9	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30482	no	2
			c24cadaee2413c175bf794c6c8e9fb797eeb774c		
Warnings:					
Information:					
Total Files Size (in bytes):			133599		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/698,977		Filing Date 09/08/2017		☐ To be Mailed	
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO									
APPLICATION AS FILED - PART I									
		(Column 1)			(Column 2)				
FOR		NUMBER FILED	NUMBER EXTRA			RATE (\$)	FEE (\$)		
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A			N/A			
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A			N/A			
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A			N/A			
TOTAL CLAIMS (37 CFR 1.16(j))		minus 20 =	*			x \$40 =			
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*			x \$210 =			
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.					TOTAL				
APPLICATION AS AMENDED - PART II									
		(Column 1)			(Column 2)	(Column 3)			
AMENDMENT	07/02/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0		x \$50 =	0	
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x \$230 =	0	
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
		(Column 1)			(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=		x \$0 =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x \$0 =		
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		LIE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						/SHARON D HARRIS/			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".									
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".									
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/698,977	09/08/2017	Martin Koebler	5438.00307c4	5976
141471	7590	01/02/2019		
Maiorana, PC - Invently Automotive 24840 Harper Suite 100 St. Clair Shores, MI 48080			EXAMINER PIPALA, EDWARD J	
			ART UNIT	PAPER NUMBER
			3663	
			NOTIFICATION DATE	DELIVERY MODE
			01/02/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

donna@maioranapc.com
maioranapc@aol.com
office@maioranapc.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application is being examined under the pre-AIA first to invent provisions.

This Office action is in response to the application filed on 09/08/17.

Claims 1-17 are presently pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of pre-AIA 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-17 are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Koike (US Pat. 6,169,495).

With respect to independent claim 1, reciting an apparatus comprising:

a sensor interface configured to receive sensor data samples during operation of a vehicle (figures 13, 14, 16 wrt interface 62);

a memory configured to store said sensor data samples over a number of points in time (col. 11, line 34 through col. 12, line 52 wrt changes in vehicle position with points in time); and

a processor configured to (i) analyze said sensor data samples stored in said memory to detect a pattern (col. 11, lines 6-32 wrt nodes and branches stored with road information such as slope), pattern and (ii) predict a destination of a driver (col. 6, lines 28-43 wrt estimation of moments of vehicles) in response to (a) said pattern and (b) historical data associated with operation of said vehicle (col. 12, lines 1-60 wrt state of vehicle traffic stored in matrix form as a sequence of times, t_1 , t_2 , t_3 , t_4 representing traffic congestion), wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of

said sensor data samples comprises telemetry data (col. 11, lines 34-57 wrt changes in position of the vehicle and traffic or road congestion with time).

With respect to claim 2, wherein said telemetry data comprises map coordinates determined in response to a GPS signal (col. 3, line 61 through col. 4, line 4 wrt a position detection apparatus installed in vehicles).

With respect to claim 3, wherein said telemetry data comprises map coordinates determined by a map service (col. 1, lines 51-55 and col. 3, lines 2-13 wrt vehicle traffic control implemented in an area).

With respect to claim 4, wherein said destination of said driver is predicted based on statistical destination logic (col. 4, lines 39-44 and col. 6, lines 28-43 wrt estimation of vehicle movement and destination).

With respect to claim 5, wherein said processor is further configured to generate a likelihood that a particular driver is operating said vehicle based on said pattern detected (col. 3, lines 19-23 wrt a course pattern taken by vehicles or operators).

With respect to claim 6, wherein said telemetry data is used to determine route segments (col. 5, lines 44-59 wrt controller-vehicle communication channel and col. 6, lines 28-43 wrt estimation of vehicle movements).

With respect to claim 7, wherein said pattern comprises which of said route segments said vehicle has traveled (col. 11, lines 6-32 wrt storing route data as nodes and branches for times t_1 , t_2 , t_3 , t_4 , etc).

With respect to claim 8, wherein said apparatus is further configured to transmit said predicted destination to a remote database (col. 12, lines 24-52 wrt vehicle possible courses and optimizing traffic

from among N-number of combinations).

With respect to claim 9, wherein said remote database is configured to receive a plurality of said predicted destinations and generate guidance information based on said plurality of said predicted destinations (col. 12, lines 24-52 wrt vehicle possible courses and optimizing traffic from among N-number of combinations).

With respect to claim 10, wherein said remote database is configured to (i) receive said sensor data samples and store said sensor data samples as said historical data and (ii) present said historical data to said apparatus (col. 12, lines 24-52 wrt vehicle possible courses and optimizing traffic from among N-number of combinations).

With respect to claim 11, wherein said memory is further configured to store said historical data (col. 11, lines 8-12 wrt storing a plurality of intersections as nodes and branches and col. 12, lines 5-39 wrt a multi-dimensional vehicle intersection state matrix).

With respect to claim 12, wherein said historical data comprises route segments traveled, a sequence of route segments traveled and travel destinations (col. 13, lines 41-65 wrt the state vector matrix and estimating destination on the basis of present position and speed).

With respect to claim 13, wherein said historical data comprises information about operation of said vehicle (col. 13, lines 41-65 wrt the state vector matrix and estimating destination on the basis of present position and speed).

With respect to claim 14, wherein at least one of said sensor data samples comprises a data sample from an optical sensor (col. 1, lines 30-50 wrt driverless vehicles).

With respect to independent claim 15, reciting a method for predicting a destination of a vehicle, comprising the steps of:

- (A) monitoring a plurality of sensors to generate sensor data samples during operation of a vehicle (figures 13, 14, 16 wrt interface 62)3;
- (B) storing said sensor data samples over a number of points in time (col. 11, line 34 through col. 12, line 52 wrt changes in vehicle position with points in time);
- (C) analyzing said sensor data samples to detect a pattern (col. 11, lines 6-32 wrt nodes and branches stored with road information such as slope); and
- (D) predicting a destination of a driver (col. 6, lines 28-43 wrt estimation of moments of vehicles) in response to (a) said pattern and (b) historical data associated with operation of said vehicle (col. 12, lines 1-60 wrt state of vehicle traffic stored in matrix form as a sequence of times, t_1 , t_2 , t_3 , t_4 representing traffic congestion), wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data (col. 11, lines 34-57 wrt changes in position of the vehicle and traffic or road congestion with time).

With respect to independent claim 16, reciting a vehicle comprising:

- a power train (col. 17, lines 41-45 wrt vehicle controller and drivetrain);
- a drive train (col. 17, lines 41-45 wrt vehicle controller and drivetrain);
- a sensor interface configured to receive sensor data samples during operation of a vehicle (figures 13, 14, 16 wrt interface 62);
- a storage device configured to store said sensor data samples over a number of points in time (col. 11, line 34 through col. 12, line 52 wrt changes in vehicle position with points in time); and
- a processing device configured to (i) analyze said sensor data samples stored in said storage device to detect a pattern (col. 11, lines 6-32 wrt nodes and branches stored with road information such as slope) and (ii) predict a destination of a driver (col. 6, lines 28-43 wrt estimation of moments of vehicles) in response to (a) said pattern and (b) historical data associated with operation of said vehicle (col. 12, lines 1-60 wrt state of vehicle traffic stored in matrix form as a sequence of times, t_1 , t_2 , t_3 , t_4 representing traffic

congestion), wherein (i) at least one of said sensor data samples is driver-related and (ii) at least one of said sensor data samples comprises telemetry data. (col. 11, lines 34-57 wrt changes in position of the vehicle and traffic or road congestion with time)

With respect to claim 17, further comprising:

an apparatus configured to (i) receive said predicted destination and (ii) adapt an operation of said vehicle based on said predicted destination (please see figures 8-11 and 13-21 wrt communications and course matrix generator and vehicle controller of figure 10 in particular).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDWARD J. PIPALA whose telephone number is (571)272-1360. The examiner can normally be reached on M-F generally 8 am - 6 pm (Eastern).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Ortiz can be reached on (571) 272-1206. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EDWARD J PIPALA/
Examiner, Art Unit 3663

<i>Notice of References Cited</i>	Application/Control No. 15/698,977		Applicant(s)/Patent Under Reexamination Koebler et al.	
	Examiner EDWARD J PIPALA		Art Unit 3663	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-6169495-B1	01-2001	Koike; Shin	B61L27/0016	340/435
*	B	US-5818356-A	10-1998	Schuessler; Robert	G01C21/3446	340/995.12
*	C	US-20070282638-A1	12-2007	Surovy; Martin	G06Q40/02	705/4
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Search Notes</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner EDWARD J PIPALA	Art Unit 3663

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
B60K 2350/1056, 1092, 1076	12/26/2018	ejp
B60K35/00	12/26/2018	ejp
B60W 30/00, 095	12/26/2018	ejp
B60W 40/00, 02, 04, 06, 072, 09	12/26/2018	ejp
B60W 2520/00, 14, 145	12/26/2018	ejp
B60W 2540/00, 12, 18, 20, 28, 30	12/26/2018	ejp
B60W 2550/00, 13, 14, 141, 142, 143, 145, 146	12/26/2018	ejp

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Reviewed PLUS results	12/26/2018	ejp
EAST text and image search (CPC sets searched in part)	12/26/2018	ejp

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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<i>Search Notes</i> 	Application/Control No. 15/698,977	Applicant(s)/Patent Under Reexamination Koebler et al.
	Examiner EDWARD J PIPALA	Art Unit 3663

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	49	(US-15693899-\$ US-4284941-\$ US-4403208-\$ US-4469210-\$ US-4621856-\$ US-4625210-\$ US-4768916-\$ US-4775939-\$ US-4797049-\$ US-4833442-\$ US-5026153-\$ US-5222906-\$ US-5231253-\$ US-5254996-\$ US-5360287-\$ US-5415505-\$ US-5454672-\$ US-5469676-\$ US-5477217-\$ US-5525026-\$ US-5540158-\$ US-5589827-\$ US-5628596-\$ US-5634339-\$ US-5702223-\$ US-5711368-\$ US-5732785-\$ US-5734316-\$ US-5775858-\$ US-5777451-\$ US-5777565-\$ US-5808372-\$ US-5809480-\$ US-5818356-\$ US-5838251-\$ US-5846045-\$ US-5854987-\$ US-5863026-\$ US-5864831-\$ US-5873250-\$ US-5878361-\$ US-5878362-\$ US-5896554-\$ US-5928294-\$ US-5959572-\$ US-5964572-\$ US-6059899-\$ US-6098048-\$ US-6122571-\$ US-6169495-\$).DID.	US-PGPUB; USPAT	OR	OFF	2018/12/26 08:32
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L6	189	B60K2350/1076	US-PGPUB; USPAT	OR	OFF	2018/12/26 09:45
L7	2787	B60K35/00	US-	OR	OFF	2018/12/26

			PGPUB; USPAT			09:45
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12/ 26/ 2018 1:01:20 PM

C:\Users\epipala\Documents\EAST\Workspaces\15693899.wsp

PLUS Search Results for S/N 15698977, Searched Wed Nov 28 13:42:23 EST 2018

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

4320400 99	3702393 95
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6016713 99	
6249766 99	
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PLUS Search Results for S/N 15698977, Searched Wed Nov 28 13:42:24 EST 2018

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

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5734316 99	
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/698,977	09/08/2017	Martin Koebler	5438.00307c4

CONFIRMATION NO. 5976

141471

Christopher P. Maiorana, PC

24840 Harper

Suite 100

St. Clair Shores, MI 48080

PUBLICATION NOTICE



OC000000097899238*

Title:VEHICLE DESTINATION PREDICTION

Publication No.US-2018-0065484-A1

Publication Date:03/08/2018

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

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Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/698,977	09/08/2017	Martin Koebler	5438.00307c4

CONFIRMATION NO. 5976

POA ACCEPTANCE LETTER



OC000000095967579

141471

Christopher P. Maiorana, PC

24840 Harper

Suite 100

St. Clair Shores, MI 48080

Date Mailed: 12/07/2017

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/01/2017.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/qtran/

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PTO/AIA/28(07-12)

Approved for use through 11/30/2014. OMB 0651-0038

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POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the attached transmittal letter.

- ☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

141471

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- ☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

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I am the Applicant

- ☐ Inventor or Joint Inventor
☐ Legal Representative of a Deceased or Legally Incapacitated Inventor
☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign
☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.48(b)(2) was granted in the application or is concurrently being filed with this document)

SIGNATURE of Applicant for Patent

Signature		Date	12/19/2017
Name	Greg Mizell	Telephone	850-460-0578
Title and Company	Chief Executive Officer, Invenity Automotive Inc.		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms for more than one signature, see below.

☒ Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.61, 1.62 and 1.63. The information is required to obtain or retain a benefit by the public which is to be used by the USPTO in processing an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 5 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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ST. CLAIR SHORES, MICHIGAN 48080

CHRISTOPHER P. MAIORANA
ROBERT M. MILLER
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(586) 498-0670
Fax (586) 498-0673
maioranapc.com

PATENTS, TRADEMARKS
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FACSIMILE MESSAGE

TO: _____
COMPANY: United States Patent and Trademark Office
RE: Serial No. 15/698,977 - Filed: September 8, 2017
FILE NO.: 5438.00307c4
FAX NO.: 571-273-8300
FROM: Christopher P. Maiorana
DATE: December 1, 2017 TIME: _____
TOTAL NUMBER OF PAGES 2 (including cover sheet)

If you do not receive any of these pages, please telephone us at (586) 498-0670 or telefax us at (586) 498-0673.

COMMENTS:

ATTACHED: POWER OF ATTORNEY BY APPLICANT (1 page).

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/698,977	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	17	minus 20 = *	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *	x 210 =	0.00	OR		
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		OTHER THAN SMALL ENTITY
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	RATE(\$)
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	ADDITIONAL FEE(\$)
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		OTHER THAN SMALL ENTITY
	Total (37 CFR 1.16(i))	*	Minus **	=	x =	OR	RATE(\$)
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =	OR	ADDITIONAL FEE(\$)
	Application Size Fee (37 CFR 1.16(s))					OR	
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					OR	
			TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.							



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
15/698,977	09/08/2017	3661	800	5438.00307c4	17	3

CONFIRMATION NO. 5976

UPDATED FILING RECEIPT

141471
Christopher P. Maiorana, PC
24840 Harper
Suite 100
St. Clair Shores, MI 48080



0000000095794733

Date Mailed: 11/30/2017

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Martin Koebler, Saal/Donau, GERMANY;
Nicole G. Goldstein, Woodside, CA;
Stephen J. Brown, Woodside, CA;
Jason H. Harper, Pleasanton, CA;

Applicant(s)

Invently Automotive Inc., Los Altos, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/626,676 06/19/2017
which is a CON of 14/566,848 12/11/2014 PAT 9682624
which is a CON of 14/206,138 03/12/2014 PAT 8972162
which is a CON of 13/066,189 04/08/2011 PAT 8712650
which is a CIP of 11/283,137 11/17/2005 PAT 7925426

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 10/18/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/698,977**

Projected Publication Date: 03/08/2018

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

VEHICLE DESTINATION PREDICTION

Preliminary Class

701

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

page 2 of 4

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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NOT GRANTED

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/698,977		Filing Date 09/08/2017		☐ To be Mailed		
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO										
APPLICATION AS FILED - PART I										
		(Column 1)	(Column 2)							
FOR		NUMBER FILED	NUMBER EXTRA		RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A		N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A		N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A		N/A					
TOTAL CLAIMS (37 CFR 1.16(j))		minus 20 =	*		x \$40 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*		x \$210 =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.					TOTAL					
APPLICATION AS AMENDED - PART II										
		(Column 1)	(Column 2)		(Column 3)					
AMENDMENT	11/29/2017	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 17	Minus	** 20		= 0		x \$40 =		0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3		= 0		x \$210 =		0
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
							TOTAL ADD'L FEE		0	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**		=		x \$0 =		
	Independent (37 CFR 1.16(h))	*	Minus	***		=		x \$0 =		
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
							TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.							LIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".							marsha R richards			
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".										
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Martin Koebler et al.
Serial No.: 15/698,977
Title: VEHICLE DESTINATION PREDICTION
Filed: September 8, 2017
Attorney Docket No.: 5438.00307c4
Art Unit: 3661

PRELIMINARY AMENDMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Please amend the above-identified application as follows:

IN THE SPECIFICATION

Please replace the Abstract on page 70 with the following paragraph:

~~Described herein are devices, systems, and methods for managing the power consumption of an automotive vehicle, and thereby for optimizing the power consumption of the vehicle. The devices and systems for managing the power consumption of the vehicle typically include power management logic that can calculate an applied power for the vehicle engine based on information provided from the external environment of the vehicle, the operational status of the vehicle, one or more command inputs from a driver, and one or more operational parameters of the vehicle.~~

An apparatus comprising a sensor interface, a memory and a processor. The sensory interface may be configured to receive sensor data samples during operation of a vehicle. The memory may be configured to store the sensor data samples over a number of points in time. The processor may be configured to (i) analyze the sensor data samples stored in the memory to detect a pattern and (ii) predict a destination of a driver in response to (a) the pattern and (b) historical data associated with operation of the vehicle. At least one of the sensor data samples may be driver-

related. At least one of the sensor data samples may comprise
telemetry data.

AMENDMENTS TO THE CLAIMS

1 1. (CURRENTLY AMENDED) An apparatus comprising:
2 a sensor interface configured to receive sensor data
3 samples during operation of a vehicle;
4 a memory configured to store said sensor data samples
5 over a number of points in time; and
6 a processor configured to (i) analyze said sensor data
7 samples stored in said memory to detect a ~~pattern~~, pattern and (ii)
8 predict a destination of a driver in response to (a) said pattern
9 and (b) historical data associated with operation of said vehicle,
10 wherein (i) at least one of said sensor data samples is driver-
11 related and (ii) at least one of said sensor data samples comprises
12 telemetry data.

1 2. (ORIGINAL) The apparatus according to claim 1,
2 wherein said telemetry data comprises map coordinates determined in
3 response to a GPS signal.

1 3. (ORIGINAL) The apparatus according to claim 1,
2 wherein said telemetry data comprises map coordinates determined by
3 a map service.

1 4. (ORIGINAL) The apparatus according to claim 1,
2 wherein said destination of said driver is predicted based on
3 statistical destination logic.

1 5. (ORIGINAL) The apparatus according to claim 1,
2 wherein said processor is further configured to generate a
3 likelihood that a particular driver is operating said vehicle based
4 on said pattern detected.

1 6. (ORIGINAL) The apparatus according to claim 1,
2 wherein said telemetry data is used to determine route segments.

1 7. (ORIGINAL) The apparatus according to claim 6,
2 wherein said pattern comprises which of said route segments said
3 vehicle has traveled.

1 8. (ORIGINAL) The apparatus according to claim 1,
2 wherein said apparatus is further configured to transmit said
3 predicted destination to a remote database.

1 9. (ORIGINAL) The apparatus according to claim 8,
2 wherein said remote database is configured to receive a plurality
3 of said predicted destinations and generate guidance information
4 based on said plurality of said predicted destinations.

1 10. (ORIGINAL) The apparatus according to claim 8,
2 wherein said remote database is configured to (i) receive said
3 sensor data samples and store said sensor data samples as said
4 historical data and (ii) present said historical data to said
5 apparatus.

1 11. (ORIGINAL) The apparatus according to claim 1,
2 wherein said memory is further configured to store said historical
3 data.

1 12. (ORIGINAL) The apparatus according to claim 1,
2 wherein said historical data comprises route segments traveled, a
3 sequence of route segments traveled and travel destinations.

1 13. (ORIGINAL) The apparatus according to claim 1,
2 wherein said historical data comprises information about operation
3 of said vehicle.

1 14. (ORIGINAL) The apparatus according to claim 1,
2 wherein at least one of said sensor data samples comprises a data
3 sample from an optical sensor.

1 15. (ORIGINAL) A method for predicting a destination of
2 a vehicle, comprising the steps of:

3 (A) monitoring a plurality of sensors to generate sensor
4 data samples during operation of a vehicle;

5 (B) storing said sensor data samples over a number of
6 points in time;

7 (C) analyzing said sensor data samples to detect a
8 pattern; and

9 (D) predicting a destination of a driver in response to
10 (a) said pattern and (b) historical data associated with operation
11 of said vehicle, wherein (i) at least one of said sensor data
12 samples is driver-related and (ii) at least one of said sensor data
13 samples comprises telemetry data.

1 16. (CURRENTLY AMENDED) A vehicle comprising:

2 a power train;

3 a drive train;

4 a sensor interface configured to receive sensor data
5 samples during operation of a vehicle;

6 a storage device configured to store said sensor data
7 samples over a number of points in time; and

8 a processing device configured to (i) analyze said sensor
9 data samples stored in said storage device to detect a ~~pattern,~~
10 pattern and (ii) predict a destination of a driver in response to

11 (a) said pattern and (b) historical data associated with operation
12 of said vehicle, wherein (i) at least one of said sensor data
13 samples is driver-related and (ii) at least one of said sensor data
14 samples comprises telemetry data.

1 17. (ORIGINAL) The vehicle according to claim 16,
2 further comprising:

3 an apparatus configured to (i) receive said predicted
4 destination and (ii) adapt an operation of said vehicle based on
5 said predicted destination.

R E M A R K S

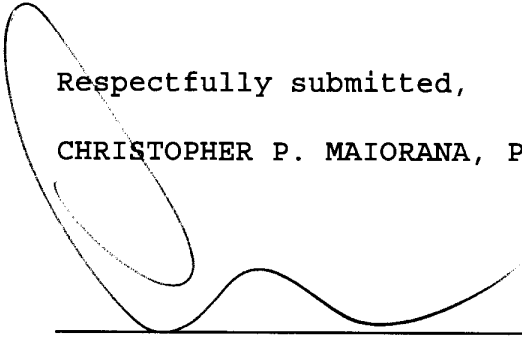
The present application is believed to be in condition for examination on the merits. Early and favorable action by the Examiner is respectfully solicited.

The Examiner is respectfully invited to call the Applicants' representative between the hours of 9 a.m. and 5 p.m. ET at 586-498-0670 should it be deemed beneficial to further advance prosecution of the application.

If any additional fees are due, please charge our office Account No. 50-0541.

Respectfully submitted,

CHRISTOPHER P. MAIORANA, P.C.



Christopher P. Maiorana
Registration No. 42,829

Dated: November 29, 2017

Docket No.: 5438.00307c4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Martin Koebler et al.
Serial No.: 15/698,977
Title: VEHICLE DESTINATION PREDICTION
Filed: September 8, 2017
Attorney Docket No.: 5438.00307c4
Art Unit: 3661

RESPONSE TO NOTICE TO FILE MISSING PARTS
OF NONPROVISIONAL APPLICATION - FILING DATE GRANTED

Mail Stop Missing Parts
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Notice to File Missing Parts dated October 19, 2017, enclosed is the payment for the statutory basic filing fee (\$70.00), the search fee (\$300.00), the examination fee (\$360.00) and the surcharge fee (\$70.00).

Respectfully submitted,

CHRISTOPHER P. MAIORANA, P.C.

Christopher P. Maiorana
Registration No. 42,829
24840 Harper Avenue, Suite 100
St. Clair Shores, MI 48080
(586) 498-0670

Dated: November 29, 2017

Electronic Patent Application Fee Transmittal				
Application Number:		15698977		
Filing Date:		08-Sep-2017		
Title of Invention:		VEHICLE DESTINATION PREDICTION		
First Named Inventor/Applicant Name:		Martin Koebler		
Filer:		Christopher P. Maiorana/Mary Donna Berkley		
Attorney Docket Number:		5438.00307c4		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	70	70
UTILITY SEARCH FEE	2111	1	300	300
UTILITY EXAMINATION FEE	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	70	70
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				800

Electronic Acknowledgement Receipt	
EFS ID:	31074363
Application Number:	15698977
International Application Number:	
Confirmation Number:	5976
Title of Invention:	VEHICLE DESTINATION PREDICTION
First Named Inventor/Applicant Name:	Martin Koebler
Customer Number:	141471
Filer:	Christopher P. Maiorana/Mary Donna Berkley
Filer Authorized By:	Christopher P. Maiorana
Attorney Docket Number:	5438.00307c4
Receipt Date:	29-NOV-2017
Filing Date:	08-SEP-2017
Time Stamp:	13:24:07
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$800
RAM confirmation Number	112917INTEFSW13264300
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		15698977_missingparts_112917.PDF	201422	yes	10
			8e94dced9dcbbe5b7b96745a2efcd8d5ebf6b3d92		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Preliminary Amendment		2	10	
	Applicant Response to Pre-Exam Formalities Notice		1	1	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37304	no	2
			02890d537d5df26b1fe2552c826aef1fb8e7b0b9		
Warnings:					
Information:					
Total Files Size (in bytes):			238726		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/698,977	
APPLICATION AS FILED - PART I (Column 1) (Column 2)							
FOR	NUMBER FILED	NUMBER EXTRA	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	70		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	300		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	17	minus 20 = *	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	
APPLICATION AS AMENDED - PART II (Column 1) (Column 2) (Column 3)							
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	*	Minus	**	=	RATE(\$)	ADDITIONAL FEE(\$)
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=
	Application Size Fee (37 CFR 1.16(s))						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		
	Total (37 CFR 1.16(i))	*	Minus	**	=	RATE(\$)	ADDITIONAL FEE(\$)
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=
	Application Size Fee (37 CFR 1.16(s))						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.							



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/698,977	09/08/2017	3661	0.00	5438.00307c4	17	3

CONFIRMATION NO. 5976

FILING RECEIPT



CC000000094830263

141471
Christopher P. Maiorana, PC
24840 Harper
Suite 100
St. Clair Shores, MI 48080

Date Mailed: 10/19/2017

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Martin Koebler, Saal/Donau, GERMANY;
Nicole G. Goldstein, Woodside, CA;
Stephen J. Brown, Woodside, CA;
Jason H. Harper, Pleasanton, CA;

Applicant(s)

Invently Automotive Inc., Los Altos, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/626,676 06/19/2017
which is a CON of 14/566,848 12/11/2014 PAT 9682624
which is a CON of 14/206,138 03/12/2014 PAT 8972162
which is a CON of 13/066,189 04/08/2011 PAT 8712650
which is a CIP of 11/283,137 11/17/2005 PAT 7925426

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: No

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 10/18/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/698,977**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

VEHICLE DESTINATION PREDICTION

Preliminary Class

701

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/698,977	09/08/2017	Martin Koebler	5438.00307c4

CONFIRMATION NO. 5976

FORMALITIES LETTER



OC000000094850264

141471
Christopher P. Maiorana, PC
24840 Harper
Suite 100
St. Clair Shores, MI 48080

Date Mailed: 10/19/2017

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.

The surcharge is due for any one of:

- late submission of the basic filing fee, search fee, or examination fee,
- late submission of inventor's oath or declaration,
- filing an application that does not contain at least one claim on filing, or
- submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- \$ **70** basic filing fee.
- \$ **70** surcharge.
- \$ **300** search fee.
- \$ **360** examination fee.
- \$(**0**) previous unapplied payment amount.
- \$ **800** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice".
<https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html>

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at <http://www.uspto.gov/ebc>.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at
(571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/thaile/

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐	Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)
--------------------------	---

Inventor Information:

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Martin		Koebler		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Saal/Donau		Country of Residenceⁱ	DE	
Mailing Address of Inventor:					
Address 1		Lindenstrasse 11			
Address 2					
City	Saal/Donau	State/Province			
Postal Code	D-93342	Countryⁱ	DE		
Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Nicole	G.	Goldstein		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
City	Woodside	State/Province	CA	Country of Residenceⁱ	US
Mailing Address of Inventor:					
Address 1		188 Alta Mesa Road			
Address 2					
City	Woodside	State/Province		CA	
Postal Code	94062	Countryⁱ	US		
Inventor	3				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Stephen	J.	Brown		

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service			
City	Woodside	State/Province	CA Country of Residence US

Mailing Address of Inventor:

Address 1	2995 Woodside Road #400-444		
Address 2			
City	Woodside	State/Province	CA
Postal Code	94062	Country i	US
Inventor	4	Remove	
Legal Name			

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jason	H.	Harper	

Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service			
City	Pleasanton	State/Province	CA Country of Residence US

Mailing Address of Inventor:

Address 1	5250 Crestline Way		
Address 2			
City	Pleasanton	State/Province	CA
Postal Code	94566	Country i	US
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button.			

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	141471		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	VEHICLE DESTINATION PREDICTION		
Attorney Docket Number	5438.00307c4	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	15	Suggested Figure for Publication (if any)	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	141471		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	15626676	2017-06-19

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number		5438.00307c4	
		Application Number			
Title of Invention	VEHICLE DESTINATION PREDICTION				

Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15626676	Continuation of	14566848	2014-12-11	9682624	2017-06-20
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14566848	Continuation of	14206138	2014-03-12	8972162	2015-03-03
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
14206138	Continuation of	13066189	2011-04-08	8712650	2014-04-29
Prior Application Status		Patented		Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13066189	Continuation in part of	11283137	2005-11-17	7925426	2011-04-12
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		

☐	This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--------------------------	---

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☒ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☒ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant	1	Remove
------------------	---	---------------------------------------

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

☒ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Invently Automotive Inc.		
-------------------	--------------------------	--	--

Mailing Address Information For Applicant:

Address 1	101 First Street, Suite 711		
Address 2			
City	Los Altos	State/Province	CA
Country	US	Postal Code	94022
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		

Assignee	1			
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
				Remove
If the Assignee or Non-Applicant Assignee is an Organization check here.				☐
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.				Add

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the **INITIAL** filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Christopher P. Maiorana/		Date (YYYY-MM-DD)	2017-09-08
First Name	Christopher	Last Name	Maiorana	Registration Number
				42,829
Additional Signature may be generated within this form by selecting the Add button.				Add

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	5438.00307c4
		Application Number	
Title of Invention	VEHICLE DESTINATION PREDICTION		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

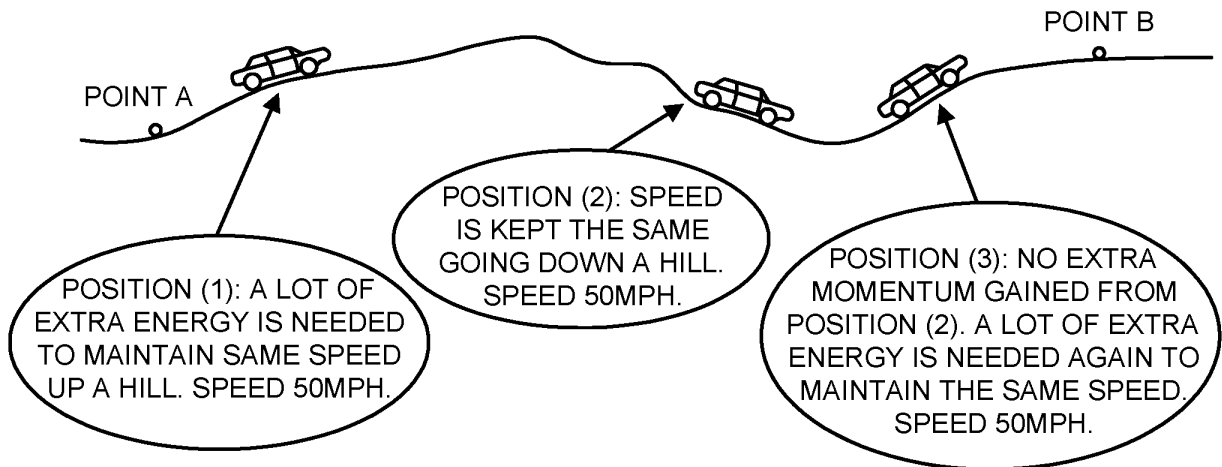
The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

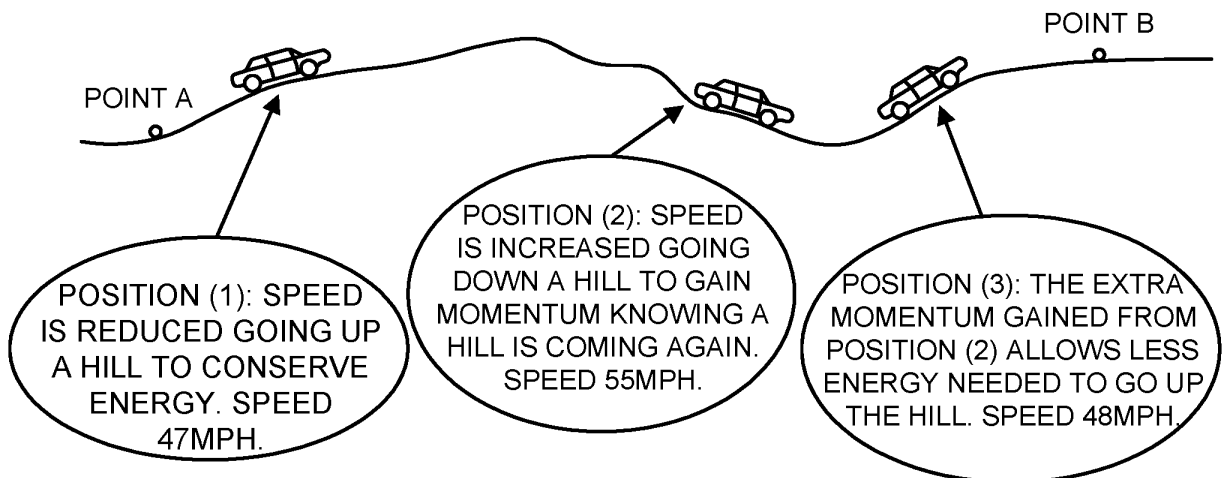
- 1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
- 3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

TYPICAL CRUISE CONTROL TODAY (VELOCITY CONTROL)

OVERALL TRIP TIME FROM POINT A TO POINT B IS 15 MIN.
THE TOTAL ENERGY USED FROM POINT A TO POINT B IS 1 KWH.

FIG. 1A

OVERALL TRIP TIME FROM POINT A TO POINT B IS 15 MIN.
THE TOTAL ENERGY USED FROM POINT A TO POINT B IS 0.9 KWH.

FIG. 1B

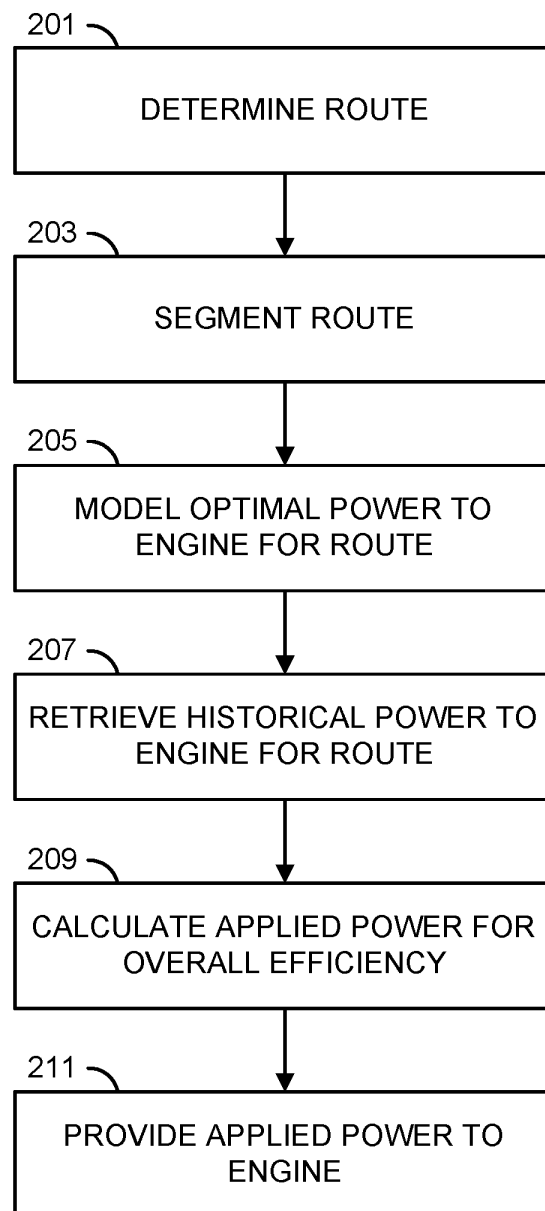


FIG. 2

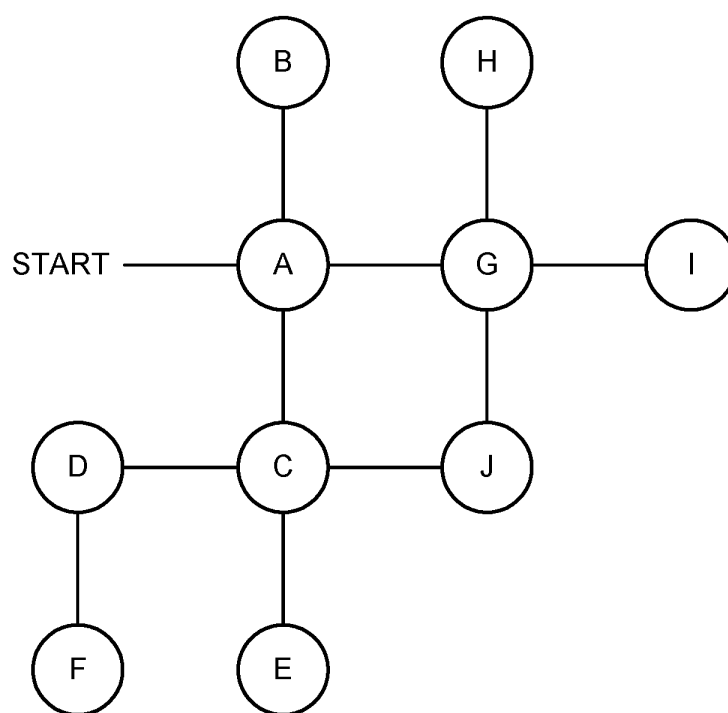


FIG. 3A

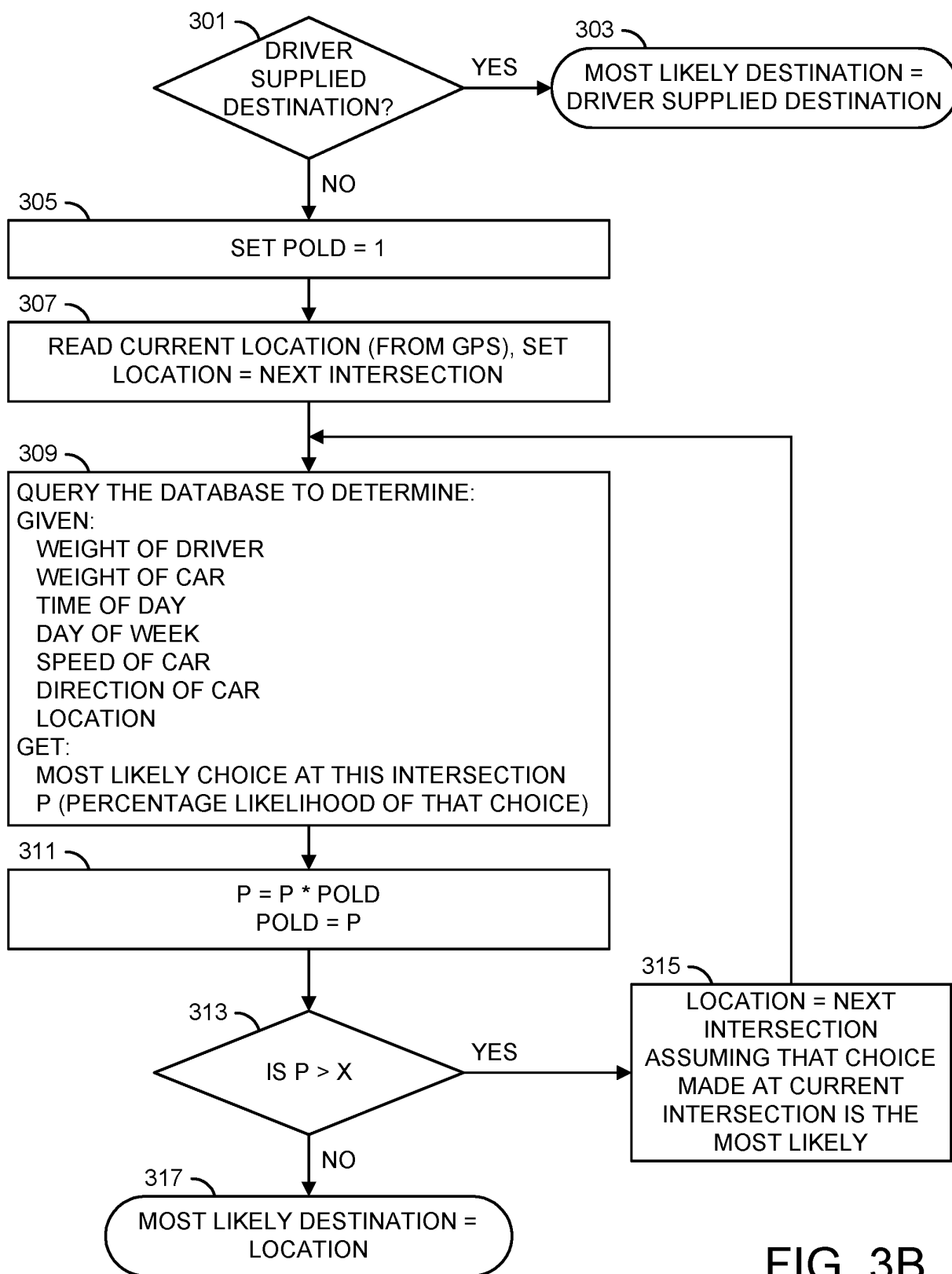
**FIG. 3B**

FIG. 4

FIG. 4A

FIG. 4B

V_{act} = ACTUAL MEASURED VELOCITY; V_{tar} = TARGET AVERAGE VELOCITY;
 P = PEDAL POSITION; Dir = DIRECTION; DoW = DAY OF WEEK;
 T = TIME OF DAY; Wd = DRIVER WEIGHT; $Ahrb$ = BATTERY AMP - HOURS;
 L_{curr} = CURRENT LOCATION;
 L_{next} = LOCATION WITH $> X\%$ CHANCE OF THE DRIVER PASSING THROUGH DURING THE TRIP

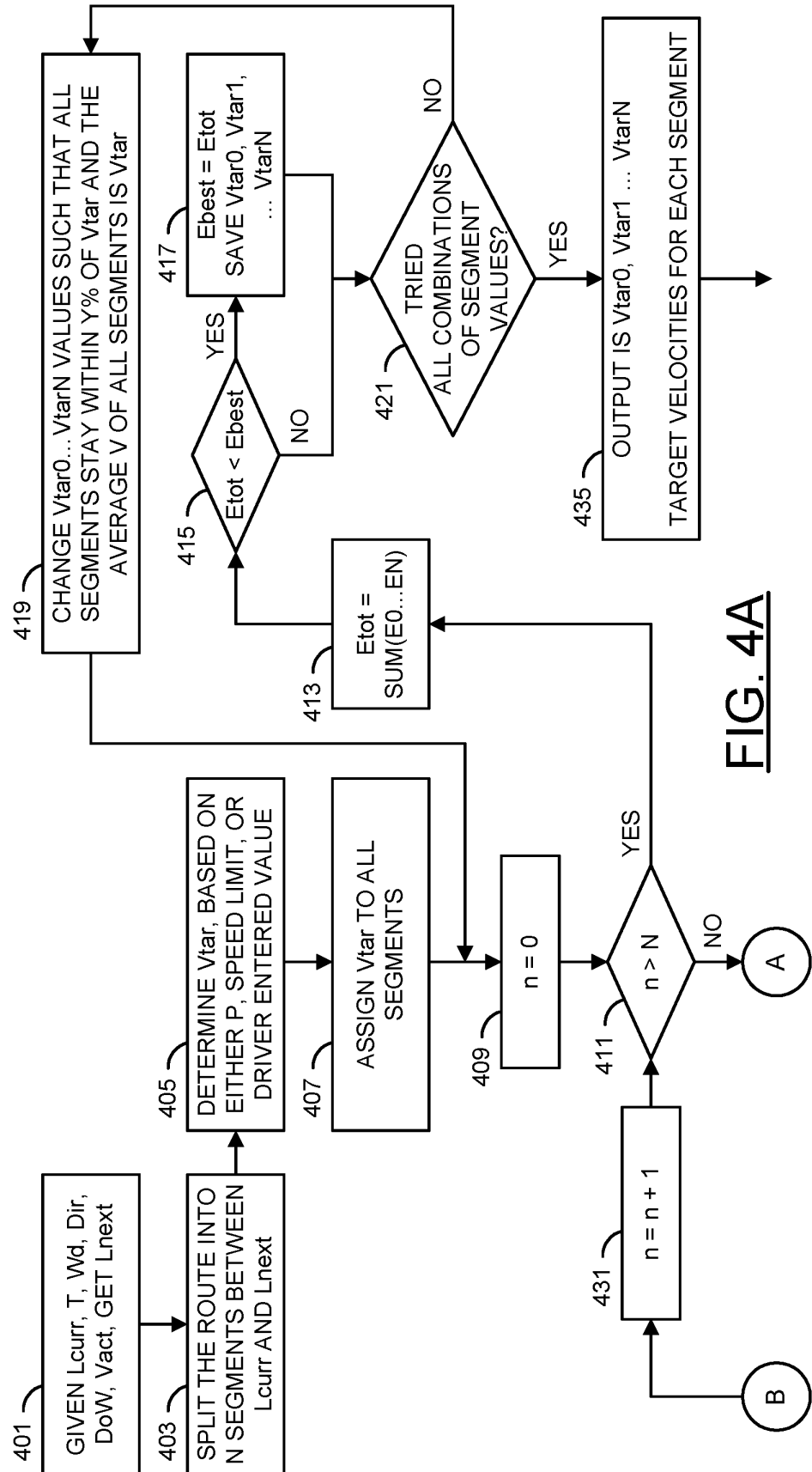
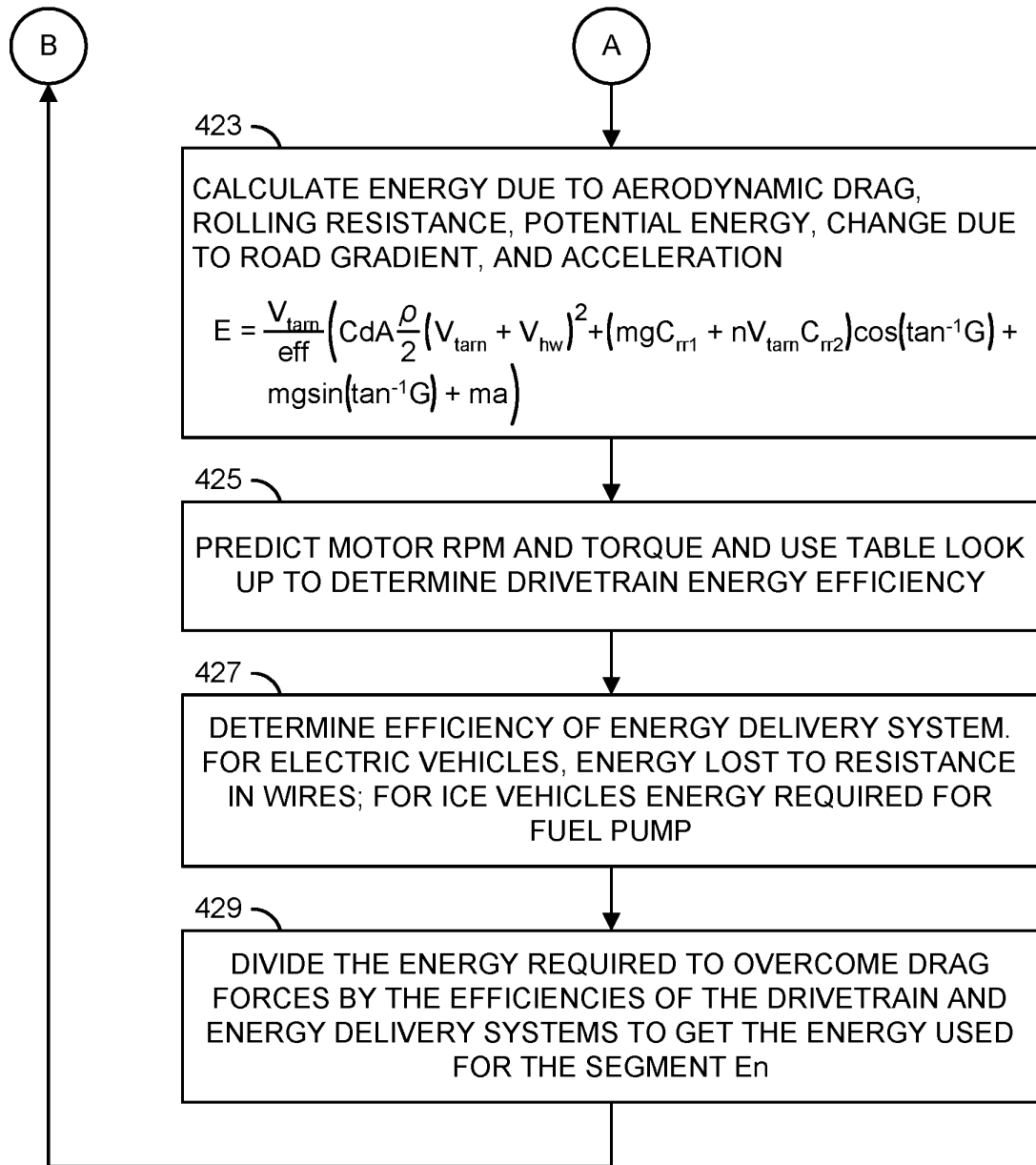
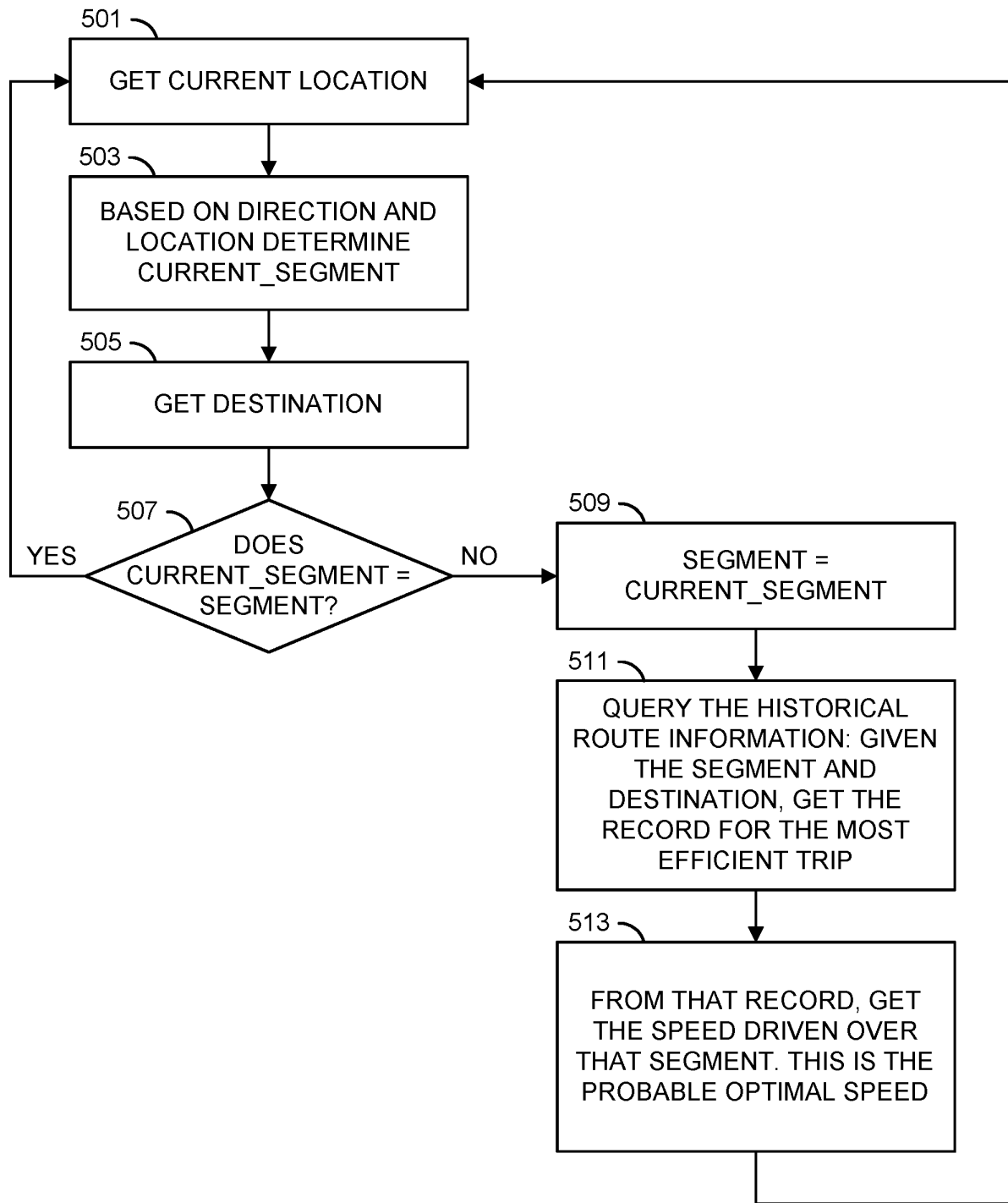
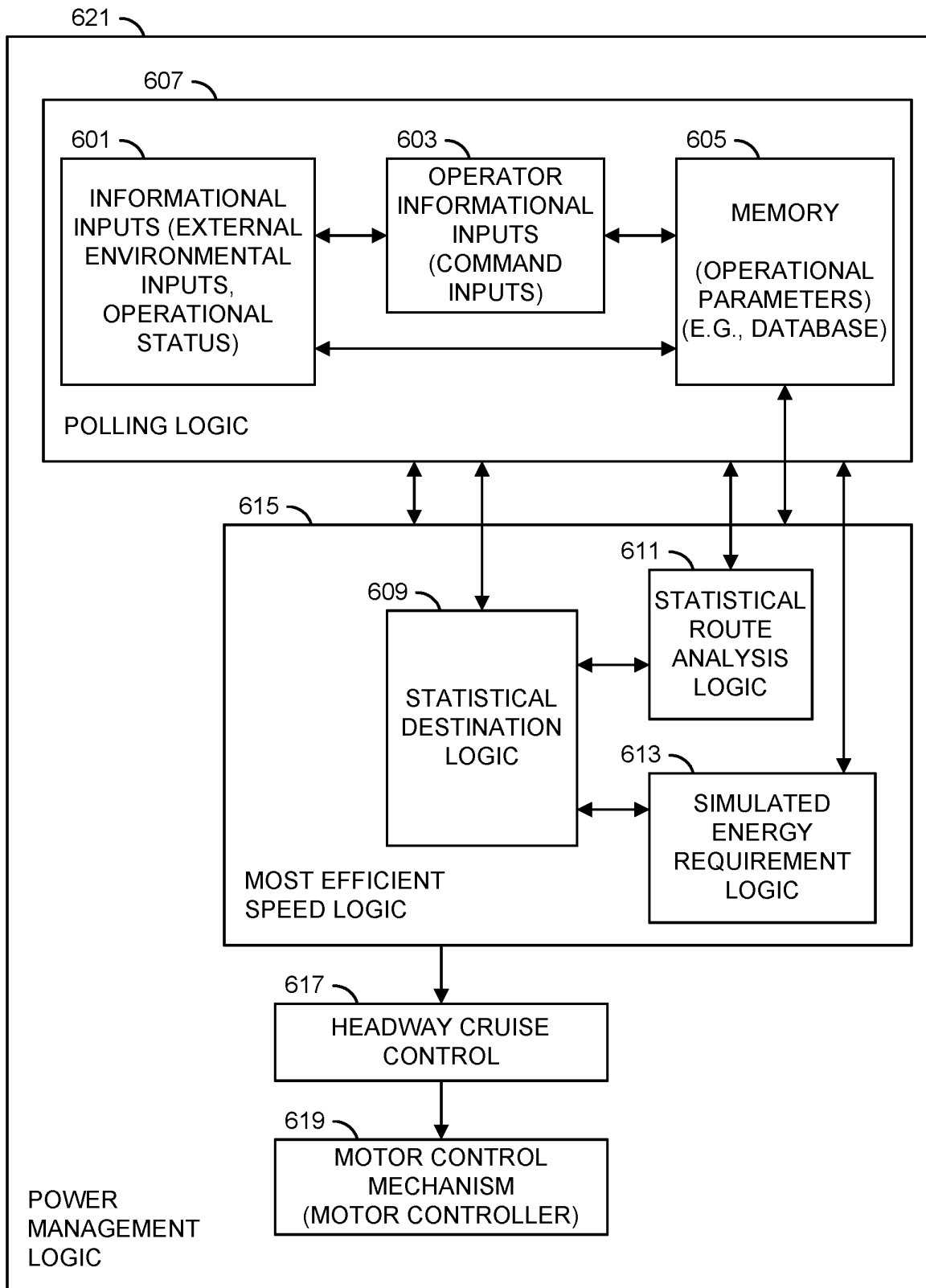


FIG. 4A

**FIG. 4B**

**FIG. 5**

**FIG. 6**

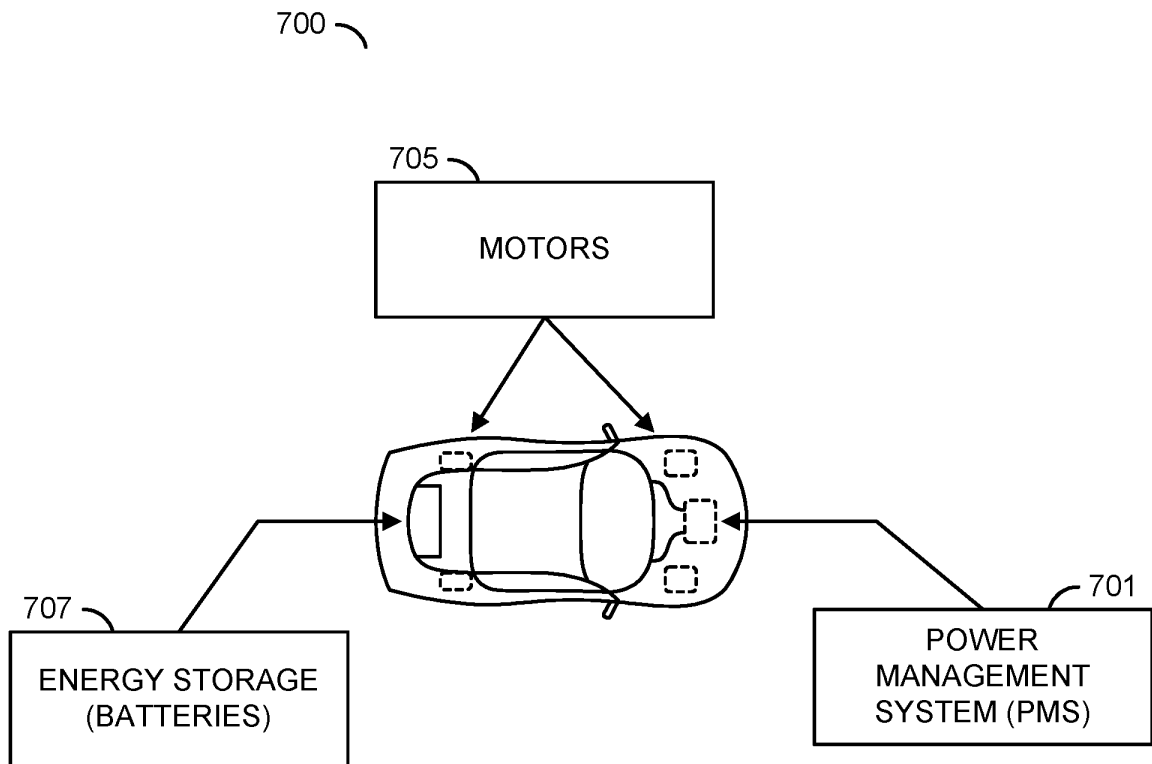


FIG. 7

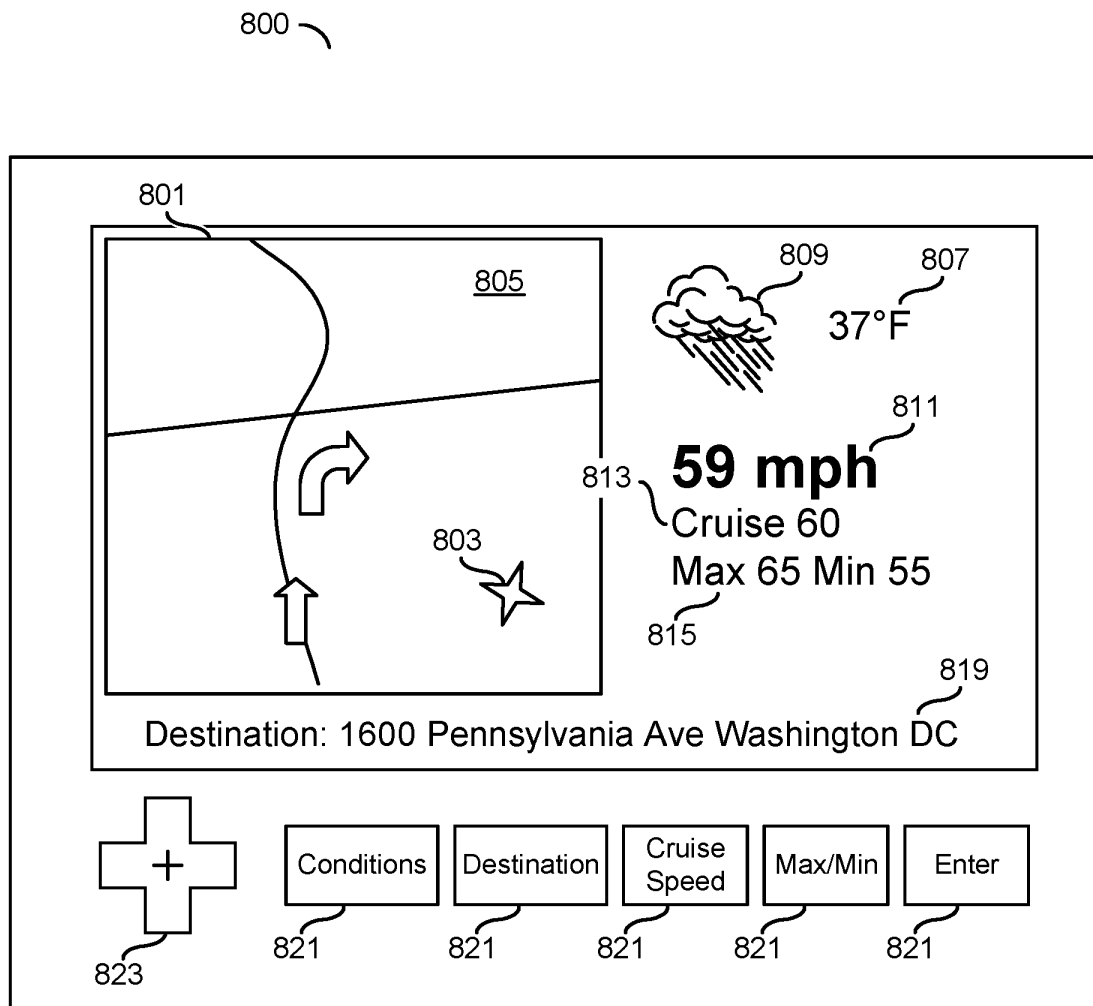


FIG. 8

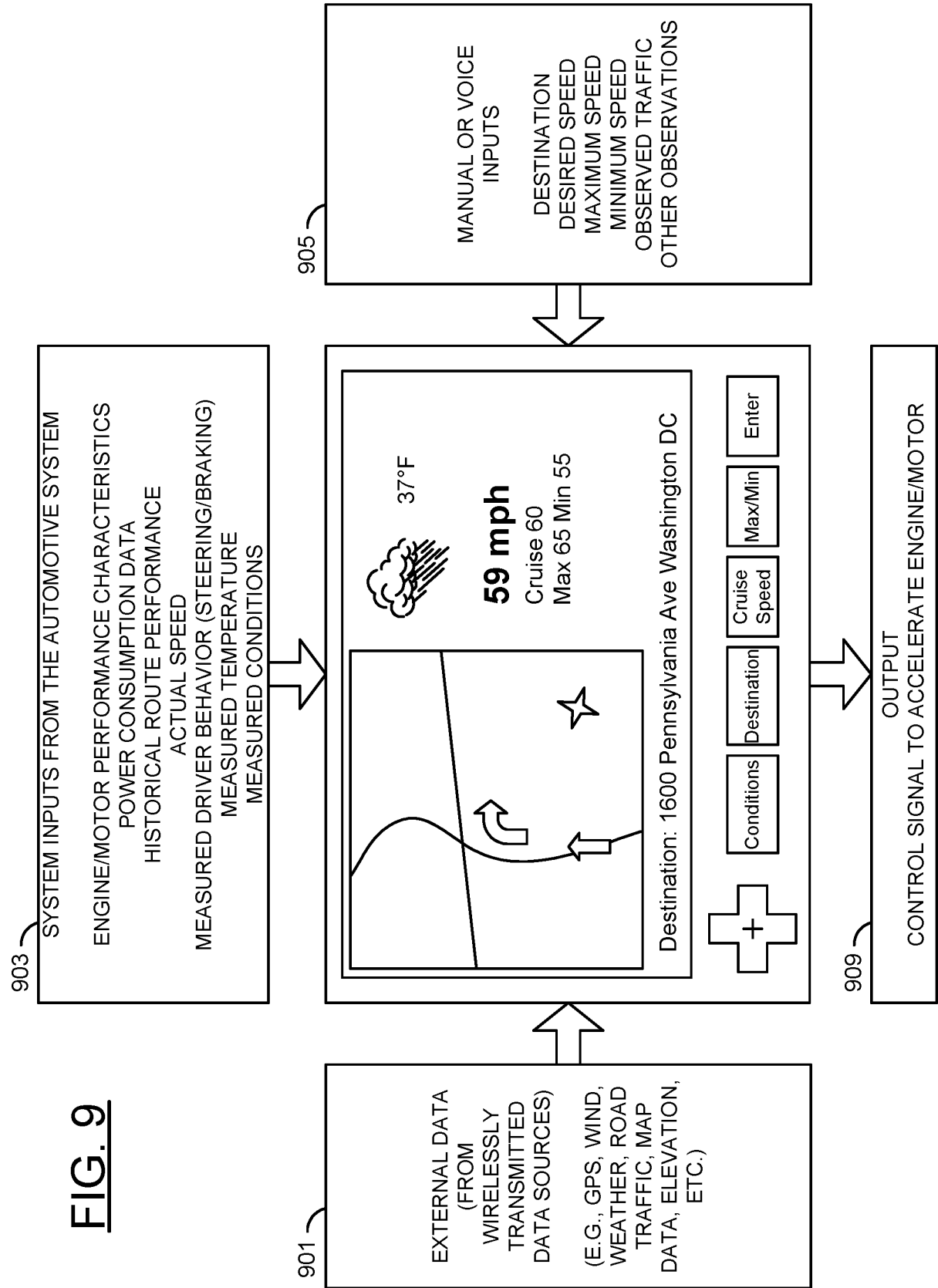


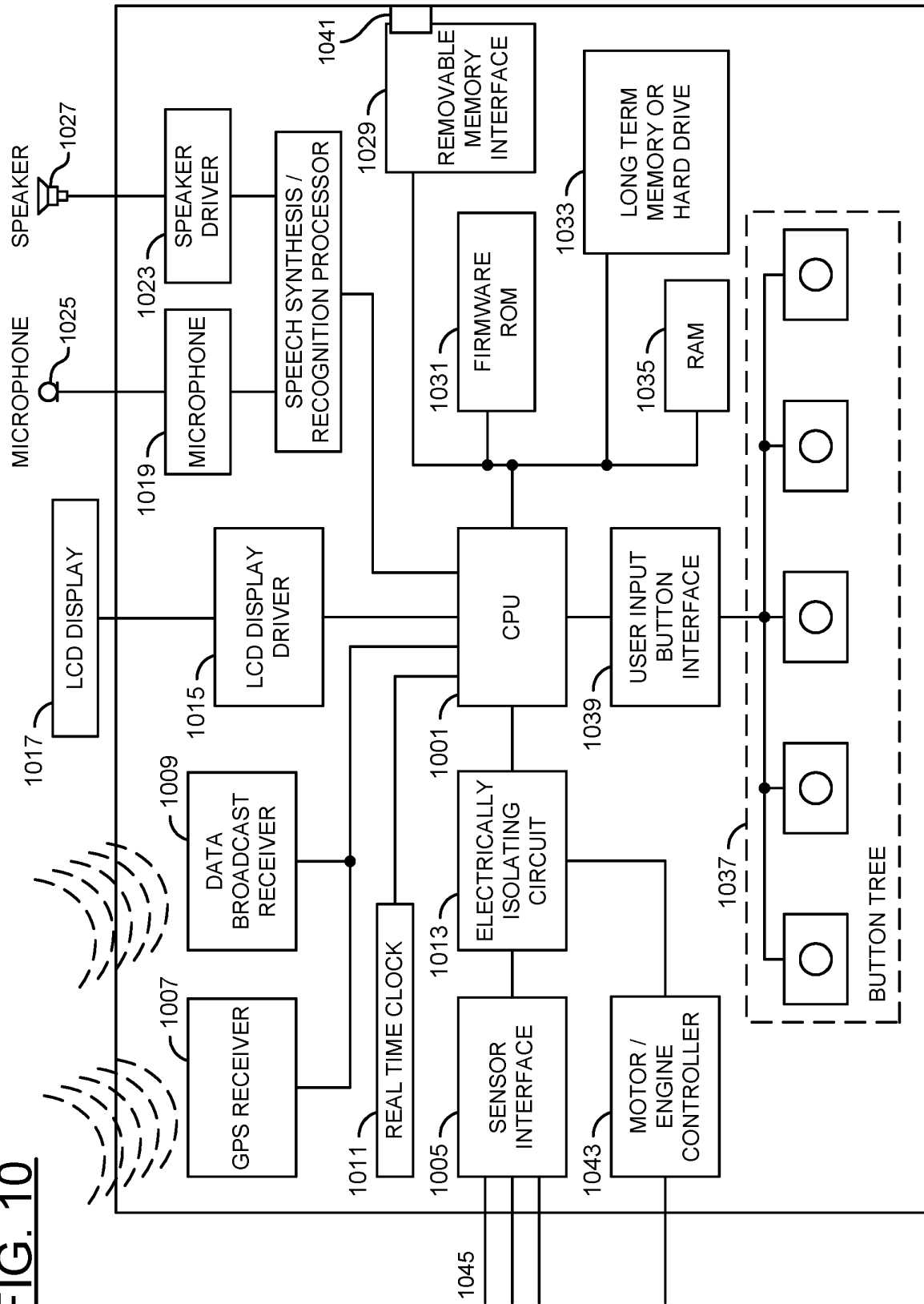
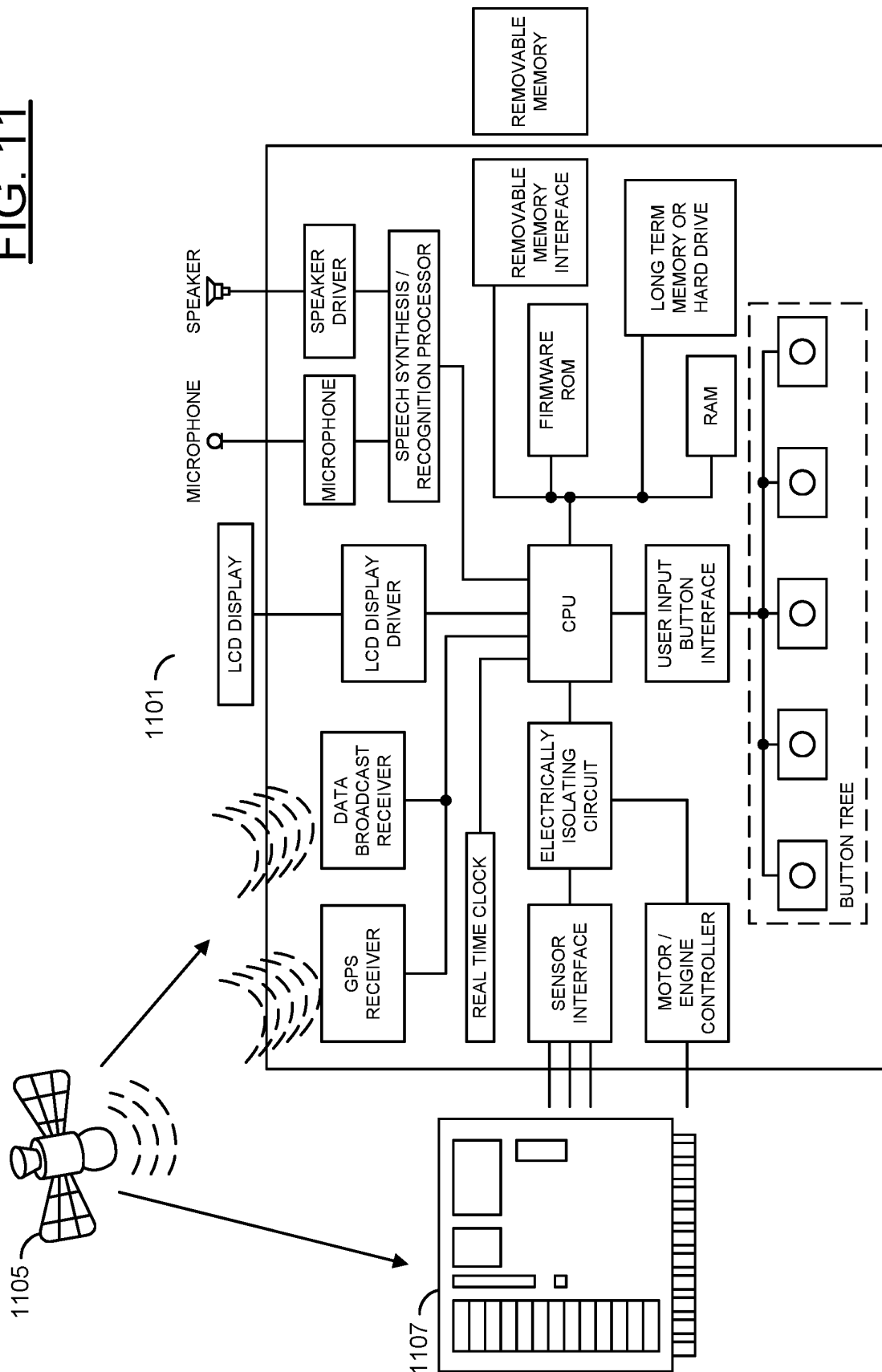
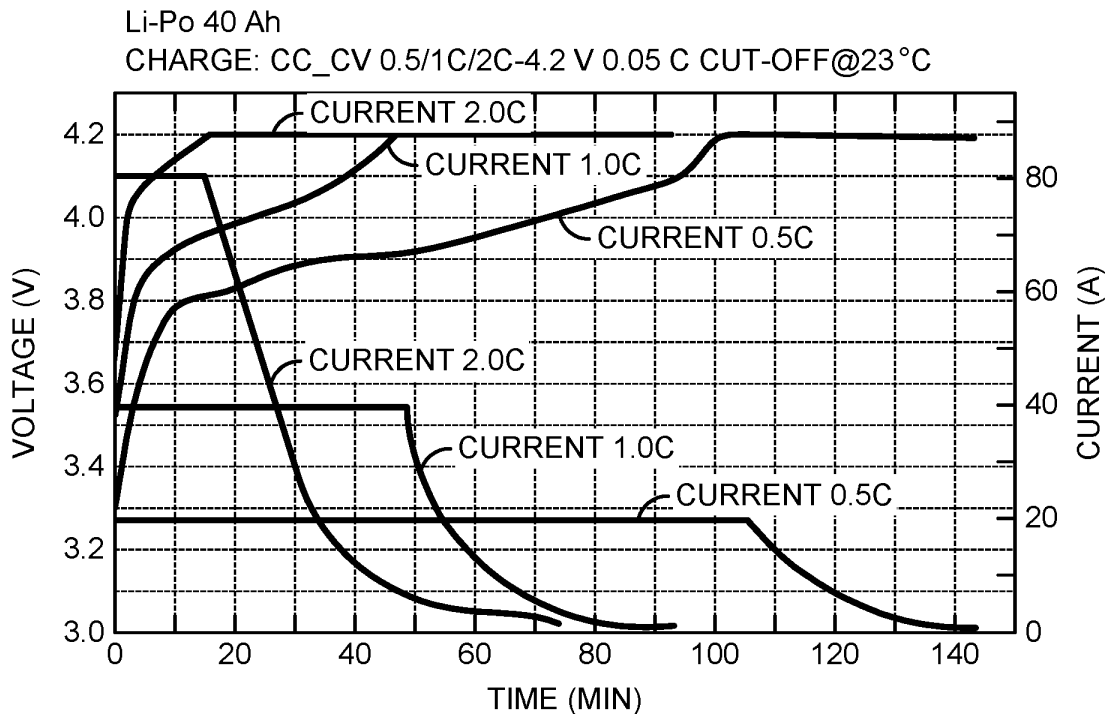
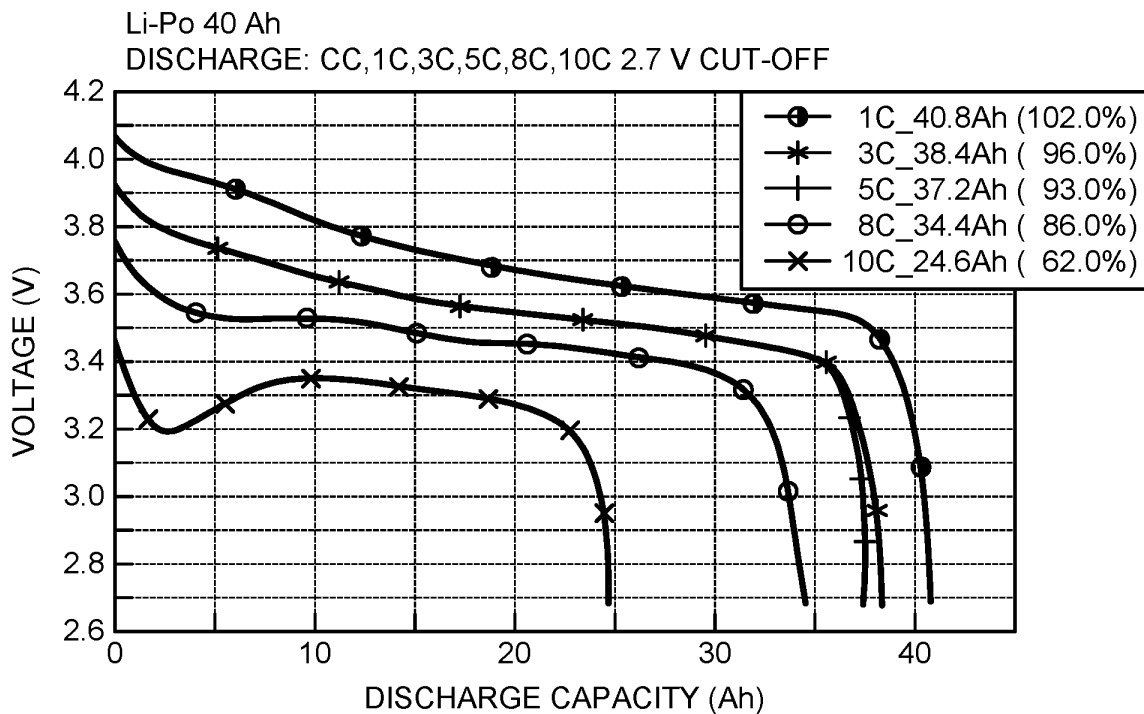
FIG. 10

FIG. 11

**FIG. 12A****FIG. 12B**

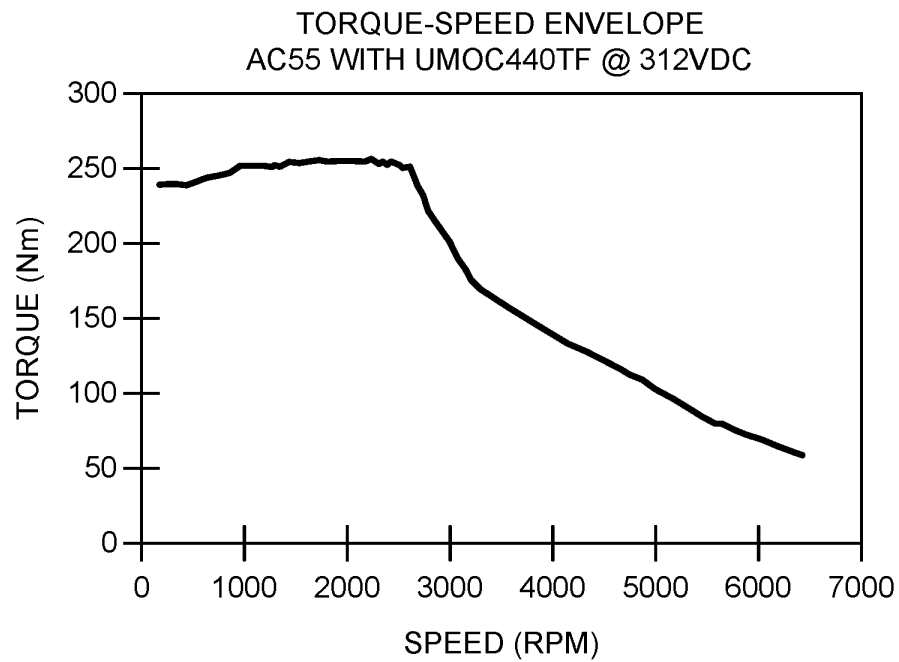


FIG. 13A

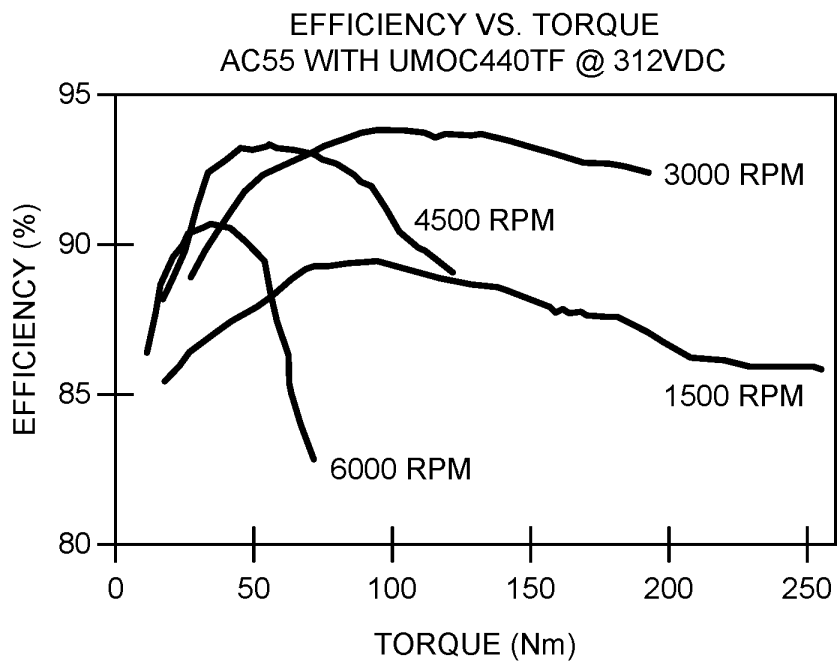


FIG. 13B

VEHICLE DESTINATION PREDICTION

This application relates to U.S. Serial No. 15/626,676,
filed June 19, 2017, which relates to U.S. Serial No. 14/566,848,
5 filed December 11, 2014, now U.S. Patent No. 9,682,624, which
relates to U.S. Serial No. 14/206,138, filed March 12, 2014, now
U.S. Patent No. 8,972,162, which relates to U.S. Serial No.
13/066,189, filed April 8, 2011, now U.S. Patent No. 8,712,650,
which relates to which U.S. Serial No. 11/283,137, filed November
10 17, 2005, now U.S. Patent No. 7,925,426, which are each
incorporated by reference in their entirety.

FIELD OF THE INVENTION

The invention relates to devices, methods and systems for
15 controlling power applied to a vehicle engine.

BACKGROUND OF THE INVENTION

Currently, drivers of automotive vehicles have only very
imprecise methods for managing the fuel consumption of their cars.
20 For example, drivers can slow down, they can brake lightly, and
they can carry lighter loads. Generally, however, fuel consumption
cannot be precisely controlled by the driver. More accurate and
precise control of fuel consumption is one of the best ways to
improve the energy efficiency of most cars. In particular,
25 accurate control of fuel consumption may optimize the energy
efficiency of a car.

It has been shown that you can reduce fuel usage by efficient driving. According to Amory Lovins of the Rocky Mountain Institute, a 35% improvement in miles per gallon (mpg) for all 2001 vehicles (whose overall average mpg was 20) would have reduced oil use in the United States by 2.7 Mbbl/d, approximately the same amount that the U.S. imported from the Gulf. See, for example, "Winning the Oil Endgame," Rocky Mountain Institute, 2004. p.50. Empirical evidence also supports the assertion that efficient driving can reduce fuel usage. For example, the Honda Insight™, a car available to the general public that normally gets 60 mpg, broke records in 2000 by getting 102 miles per gallon in a 7-day drive around the circumference of Britain. The team responsible did this purely by driving more efficiently, and not by modifying the car in any manner.

In most automotive vehicles, an operator controls the power applied to the vehicle (e.g., the engine of the vehicle) by operating the ignition, break and gas pedals. Additional control is typically provided by operational assisting devices, such as a cruise control, that help to keep the vehicle at a constant speed, or within a range of speeds. However, such operational assisting devices typically do not optimize the power consumption of the vehicle, or control the speed and/or power provided to the vehicle based on an optimal power consumption level.

Many parameters may impact the optimal power consumption of a vehicle, including external factors (e.g., forces and conditions that act on the vehicle), internal conditions (e.g., the

current status of the vehicle and it's component parts.), operator commands (e.g., control commands from the operator driving or preparing to drive the vehicle), and operational parameters of the vehicle (e.g., performance capabilities of the vehicle based on the make and model and/or the component parts of the vehicle, as well as the historical performance of the vehicle).

In recent years the need for energy efficient vehicles has increased as the cost and availability of traditional fossil fuels has fluctuated. However, the need for fuel efficiency spans all types of vehicles, including currently available vehicles (e.g., internal combustion, solar, electric, and hybrid vehicles), as well as vehicles proposed or under development (e.g., hydrogen fuel cell vehicles and other electrically-fueled vehicles). In all of these types of vehicles, the overall fuel efficiency (regardless of the type of fuel), can be improved by optimizing the power supplied to the engine. As described herein, energy efficiency may be fuel efficiency or power efficiency. Energy supplied to the vehicle (e.g., the engine) may come from any appropriate source (e.g., gas, solar, battery, hydrogen, ethanol, etc.).

Thus, there is a need for devices and systems for controlling the power applied to a vehicle engine. The devices, systems and methods described herein address many problems identified for controlling the power supplied to automotive engines raised above.

SUMMARY OF THE INVENTION

Described herein are devices, systems, and methods for managing the power consumption of an automotive vehicle, and thereby for optimizing the power consumption of the vehicle. The devices and systems for managing the power consumption of the vehicle typically include power management logic that can calculate an applied power for the vehicle engine based on information provided from the external environment of the vehicle, the operational status of the vehicle, one or more command inputs from a driver, and one or more operational parameters of the vehicle. The information provided to the power management logic may come from data inputs (e.g., sensors, telemetries, etc.), memory, user commands, or it may be derived. The power management logic may comprise software, hardware, or any combination of software or hardware. In some variations, the devices and systems include a processor (e.g., a microprocessor) that can perform the power management logic, and provide an applied power. The applied power that is determined by the power management logic may be used to control the vehicle engine. For example, the power management logic may be used by a motor control mechanism to control the application of power to the vehicle engine as the vehicle travels along a route (either a predetermined or a non-predetermined route). The applied power may also be expressed as an optimized speed or speeds to which the vehicle is controlled. For example, the motor control mechanism may adjust the speed of the vehicle to an optimized speed or speeds as the vehicle travels. Or, the

device or system may provide a suggested fuel-efficient speed to the driver, who in turn will manually adjust his/her speed. Thus, the devices, systems, and methods described herein may optimize the power consumption of an automotive vehicle by controlling the final
5 speed of the vehicle, for example, by controlling the power applied to the vehicle motor.

The system may be manually engaged by the operator either when the vehicle is turned on, or in the midst of a trip (e.g., "on the fly"). In one variation, the operator sets a preferred speed,
10 and a range at which to manage that speed (e.g., the preferred speed may be 60 mph, and the range can be 5 mph) over at least a portion of the trip. The system may determine an optimal (e.g., fuel efficient) speed within the range selected. By calculating and then averaging the efficient speed over a given route, the
15 system can optimize energy usage within the driver's stated speed and range. The power management logic may determine energy efficiency over the course of a trip, based on current location and destination. The destination of the driver does not have to be known (e.g., input into a GPS or other similar system by the
20 driver). The system (e.g., anticipated destination logic) may infer the driver's destination based on a subset of the information inputs to the system, such as the time of day, current location, previous driving habits, and other inputs. In some variations, the driver can manually accelerate (e.g., override the system) for
25 passing, braking and the like. In some variations, the device or

system may provide a suggested speed to the driver to match, in order for the driver to better optimize power usage.

In some variations, the system is automatically enabled whenever the vehicle is turned on. In this case, the operator of the vehicle does not have to set any a destination, target speed or range, or the like. By automatically monitoring the operator's real-time speed, braking and acceleration, and by utilizing applicable inputs (e.g., from sensors and/or from a database), the power management system may determine the most efficient speed to travel a route. In some variations, the device or system may adjust the vehicle speed automatically. The power management devices or systems described herein may operate whether or not the driver has entered a destination into the GPS, because the system may infer the destination based on previous driving habits if the driver has not explicitly provided a destination.

In some variations, the driver (or other user) provides the system a destination and the vehicle determines the optimal speeds to drive throughout the route. The system may use speed limits, traffic conditions, physical calculations, and statistical models from previous trips to the same destination to select the target speeds to optimize around. Thus, in some variations, the driver only needs to steer, although hard acceleration or braking by the driver may override the system.

Described herein are devices for managing the power consumption of an automotive vehicle comprising a power management logic operable to calculate an applied power for the vehicle engine

from information about the external environment of the vehicle, information about the operational status of the vehicle, one or more command inputs, and one or more operational parameters of the vehicle. The power management device may also include a processor responsive to the power management logic (e.g., a microprocessor), and a motor control mechanism, wherein the motor control mechanism controls the application of power to the vehicle engine.

The power management logic may determine an applied power for the vehicle engine based on information about the external environment of the vehicle that is selected from the group consisting of: the current location of the vehicle, the elevation of the vehicle, upcoming elevations of the vehicle, the current slope/grade of the route, the predicted slope/grade of the next segments (or upcoming segments) of the route, speed limit information of the current route segment, speed limit information of upcoming route segments, the condition of the known or predicted route (or a portion thereof), traffic information or data, traffic surrounding the vehicle, the location of stoplights, the timing of stoplights, a map of the roadway, the present angle of the sun, the predicted angle of the sun for upcoming route segments, the weather around the vehicle, present wind direction, the predicted wind direction for upcoming route segments, present wind velocity, the predicted wind velocity for upcoming route segments, current temperature, the predicted temperature for upcoming route segments, current air pressure, predicted air pressure for upcoming route segments, time of day, date, day of week, visibility, present road

conditions, predicted road conditions for upcoming route segments, and the distance to/from other vehicles. Any of this information may be acquired by measuring (e.g., from sensors), or it may be detected or input (e.g., from manual inputs, telemetry, detectors,
5 a memory, etc.), or it may be derived (e.g., based on other information, including other environmental information).

The power management logic may determine an applied power for the vehicle engine based on information about the operational status of the vehicle. The operational status information input
10 may be selected from the group consisting of: the vehicle's current speed, the motor speed, the vehicle's current orientation, the RPM of the vehicle's motor, wheel rotations per minute, the battery state, the voltage of the battery, the amp hours from the battery, the state of the battery, temperature of battery, the age
15 of the battery, and the number of times the battery has charged and discharged, the tire pressure, the drag force due to rolling resistance of the vehicle, the weight of vehicle, the amount of air going to the engine, the amount of gas going to engine, and the weight of driver. Any of this information may be acquired by
20 measuring (e.g., by sensors), or it may be input (e.g., from an external telemetry, a memory, etc.), or it may be derived (e.g., based on other information, including other operational status information).

The power management logic may determine an applied power
25 for the vehicle engine based on command input information. Command input information may be selected from the group consisting

of: the acceleration applied by a driver, the braking applied by a driver, the intended destination, preferred speed, maximum and minimum range over which speed should adjust, and preferred route. Any of this information may be acquired by input (e.g., from an external telemetry, keyboard, mouse, voice command, a memory, etc.), sensor (e.g., optical detectors, etc.), or it may be derived (e.g., based on other information, including other command information).

The power management logic may determine an applied power for the vehicle engine based on information about one or more operational parameters of the vehicle. Operational parameters may be selected from the group consisting of: aerodynamic parameters (CDA), rolling resistance parameters (Crr1 and Crr2), drive train efficiency parameters, motor efficiency parameters, and battery model parameters, battery charge and discharge relationships, type of battery. Any of this information may be input (e.g., from an external telemetry, a memory, etc.), or it may be derived (e.g., based on other information, including historical information or other operational parameter information).

The power management device or system may further comprise a memory containing vehicle information about one or more operational parameters for the vehicle. The memory may store any of the information about the external environment, operational status or command inputs, including derived or historical information.

The devices and systems described herein may be used with any appropriate vehicle, including internal combustion vehicles (which run on gasoline, diesel, or ethanol for example), a hybrid internal combustion/electric vehicles, electric vehicles powered by the electric grid (plug-in), electric vehicles powered by the sun (solar), and hydrogen fuel cell vehicles.

Also described herein are systems for managing the power consumption of an automotive vehicle, comprising a first input, operable to receive information about the external environment of the vehicle, a second input, operable to receive information about the operational status of the vehicle, a third input, operable to receive one or more command inputs from a driver of the vehicle, a memory containing information about one or more operational parameters of the vehicle, power management logic operable to calculate an applied power for the vehicle engine from the first input, the second input, the third input, and the memory, and a processor responsive to the power management logic. The system may also include a motor control mechanism, wherein the motor control mechanism regulates the application of power to the vehicle engine.

Also described herein are methods of managing the power consumption of a vehicle, including calculating an applied power for the vehicle using a processor. The processor (e.g., a microprocessor, etc.) receives a first input comprising information about the environment of the vehicle, a second input comprising information about the operational status of the vehicle, a third input comprising a command input from the driver of the vehicle,

and a fourth input comprising vehicle information about the operational parameters of the vehicle. The method may also include the step of applying the applied power to the engine of the vehicle, and/or to notifying the driver of the optimal speed.

5 The step of calculating an applied power may include determining a route, segmenting the route into one or more segment (or intermediate) destinations, calculating an energy efficient speed for the vehicle to travel to the segment destination, determining an optimized speed for the vehicle to travel to the segment destination, and calculating the applied power from the
10 optimized speed for all of the segments. The applied power may be calculated continuously. For example, the applied power may be calculated at each point (e.g., every segment, or points within a segment) as the vehicle is driven. Thus, over an entire route, the
15 most energy efficient speed at which to drive may be continuously calculated. This may be done by determining a destination, and then coming up with a route for that destination. If the destination is not known (e.g., has not been provided to the power management device or system), a predicted destination may be
20 estimated, based on statistical destination logic (e.g., using map coordinates, and the historical operation of the vehicle). Energy efficient speeds for current and upcoming route segments can then be calculated based on the route. In some variations, the route is divided up into segments. In some variations, the optimized speed
25 for the vehicle is determined based on historical speeds for

similar destinations. The route can be revised (e.g., continuously revised) during operation.

BRIEF DESCRIPTION OF THE DRAWINGS

5 FIGS. 1A, 1B show an example of a vehicle controlled by a traditional cruise control device and the same vehicle controlled by one variation of this power management system described herein.

 FIG. 2 illustrates steps that may be used to optimize power applied to a motor, as described herein.

10 FIG. 3A shows a schematic route as described herein.

 FIG. 3B shows steps that may be followed to determine a route destination.

 FIGS. 4A, 4B show steps that may be followed to determine a calculated optimized velocity for segments of a route.

15 FIG. 5 shows steps that may be followed for determining a probable optimal speed based on historical route information.

 FIG. 6 shows a schematic diagram of one variation of the power management logic described herein.

20 FIG. 7 illustrates one variation of a vehicle including a power management system, as described herein.

 FIG. 8 illustrates a user interface for a power management device.

 FIG. 9 shows inputs that may be coordinated by the power management user interface.

25 FIG. 10 shows a schematic diagram of a portion of a power management system, as described herein.

FIG. 11 illustrates a power management system remotely communicating with a server, as described herein.

FIGS. 12A, 12B show exemplary charge and discharge characteristics for one type of battery.

5 FIGS. 13A, 13B show examples of engine characteristics.

DETAILED DESCRIPTION

The power supplied and used by a motorized vehicle can be optimized based on information inputs including: user demands, environmental conditions, the current or anticipated operational state of the vehicle, and the operational parameters for the vehicle. These parameters can be estimated, directly measured, or derived, and may be used to determine the driving route, and therefore an estimated power requirement for the route. The estimated power requirement for a route and a historical power requirement from the same vehicle traveling over the same route may be used to determine the optimal power supplied to the vehicle. The power required of a vehicle and the optimal power supplied to a vehicle may also be expressed in terms of the speed or velocity of the vehicle.

10
15
20

Management of a vehicle's power supply typically involves optimization of the power supplied to the engine. As described herein, the "engine" may refer to any portion of the vehicle to which power is supplied, including the motor, powertrain, etc. As will be apparent below, optimizing the power supplied to the engine typically means minimizing the energy loss from the vehicle,

25

thereby increasing fuel efficiency. The power supplied to the engine may alternatively be optimized based on other criterion. For example, the power supplied to the engine may be optimized with respect to speed or travel time. Furthermore, the devices, methods and systems described herein may be used with any appropriate vehicle, and are not limited to internal combustion vehicles. For example, the devices, methods and systems described herein may be used with vehicles having a hybrid internal combustion/electric engine, an electric engine powered by the electric grid (e.g., a plug-in vehicle), an electric engine powered by the sun (e.g., a solar vehicle), and an electric engine powered by hydrogen fuel cell. Thus the term "fuel" does not necessarily refer exclusively to hydrocarbon fuels, but may refer to any appropriate power source for the engine.

FIGS. 1A and 1B compare a traditional "cruise control" device (in FIG. 1A) to one variation of the power management device described herein (in FIG. 1B). In FIG. 1A, a typical cruise control device regulates the speed of a vehicle as it drives from point A to point B when the vehicle speed is set to 50 mph. As the vehicle moves across different terrain (e.g., roads having different elevations), or through different weather conditions, the traditional cruise control device adjusts the power supplied to the vehicles (and thus the speed) based only on the set velocity and the actual velocity of the vehicle. Thus, the cruise control device receives information on the current speed of the vehicle, and adjusts the power supplied to the engine to maintain the

vehicle at the set speed. This type of device is a "velocity control" cruise control device. In contrast, FIG. 1B shows a vehicle with a power management device for optimizing the power supplied to the vehicle, as described further herein.

5 In FIG. 1B, the power management system receives external inputs, including information on the location and grade (e.g., steepness of any uphill/downhill portions) of the road, the distances traveled. The power management system also includes or deduces information about the route (e.g., from point A to point
10 B), and the acceptable range of speeds that the vehicle may travel over this route (e.g., between 45 and 55 mph). The power management system may also receive information about the state of the vehicle, including the velocity at which it is traveling, and the weight of the vehicle. Finally, the power management system
15 may include operational parameters such as the performance of the engine, aerodynamic performance, and rolling resistance of the vehicle. Given this information, the power management system may calculate applied power to the engine, and may derive a speed (or set of speeds) that optimizes the applied power. As shown in FIGS.
20 1A and 1B, the total energy used by the power management system in FIG. 1B is 0.9 kwh compared to 1 kwh for the cruise control system shown in FIG. 1A for identical vehicles traveling over the same pathway.

25 In general, there are many ways to optimize energy efficiency, as described in more detail below. As will be

described, any of the methods, devices and system described herein may be used together, individually, or in different combinations.

Inputs

5 The power management devices and systems described herein manage the power of the vehicle using inputs from four categories of information input: information from the external environment of the vehicle, information about the operational status of the vehicle, information from one or more command inputs, and
10 operational parameters of the vehicle. Typically, at least one input from each of these sources of information is used to determine an optimal speed (or applied power) for the vehicle. Some of the information inputs for each of these categories are described below. In every case, the information may be directly
15 measured (e.g., by sensors or other inputs), communicated from an external source, or it may be derived from other information inputs, or from stored data.

 Information from the external environment of the vehicle may be used to determine the optimal power to apply to the vehicle.
20 External environment information generally includes any information about the environment surrounding or acting on the vehicle. External information may be used to determine forces acting on the vehicle (e.g., drag, wind resistance, tire resistance, etc.), the location of the vehicle relative to the destination (e.g.,
25 position, direction, etc.), and the environment surrounding the vehicle (e.g., traffic patterns, surrounding traffic, etc.). In

some variations, the external information may be used to help describe the power available to the vehicle, particularly in solar powered vehicles (e.g., amount of light energy, time of day, position of the sun, etc.).

5 Examples of environmental information inputs include, but are not limited to: the current location of the vehicle, geographical information about the surrounding area, the elevation of the vehicle, upcoming elevations of the vehicle, the current slope/grade of road, the predicted slope/grade of the next segments
10 of road, traffic surrounding the vehicle, the location of stoplights, the timing of stoplights, a map of the roadway, the present angle of the sun, the predicted angle of the sun for upcoming route segments, the weather around the vehicle, present wind direction, the predicted wind direction for upcoming route
15 segments, present wind velocity, the predicted wind velocity for upcoming route segments, current temperature, the predicted temperature for upcoming route segments, current air pressure, predicted air pressure for upcoming route segments, time of day, date, day of week, visibility, present road conditions, predicted
20 road conditions for upcoming route segments, and the distance from other vehicles.

Some of the information inputs may be redundant, or may be derived from related information. For example, the vehicle location may be provided by a GPS device which may be either a
25 separate device or a portion of the power management device that receives a GPS signal and locates the vehicle based on the received

signal. Geographical and topographical information about the area surrounding the vehicle may be determined from the location information. For example, the location may be used to index an atlas of the surrounding area. Some variations of the power management device include a memory or database of information, including information about maps and road information. In some variations, the power management device communicates with one or more such databases to identify the location and surrounding road features (e.g., suggested speed limits, stop signs, traffic patterns, etc.).

The power management device may include or may be connected to sensors or other inputs to directly determine some of the information inputs. For example, the power management device may include a pre-set clock (e.g., for the current time and date), one or more optical sensors (e.g., to determine the intensity of sunlight, visibility, distance from nearby vehicles, etc.), and/or weather sensors (e.g., temperature, wind direction and velocity, air pressure, etc.). In some variations, the power management system receives some of this information by telemetry with off-board information sources such as databases and the like. For example, the power management system may communicate with a weather service, a map service, a traffic service, etc.

These examples of information about the external environment are only intended to illustrate the kinds of external information that may be used by the power management devices and systems described herein and are not intended to be limiting. Any

appropriate information about the external environment may be provided to the power management device or used by the power management device.

Information about the operational status of the vehicle
5 may be used to determine the optimal power to apply to the vehicle. Operational status information generally includes any information about the current operational status of the vehicle itself. Operational status information may be used to determine the current condition of the vehicle's engine and component parts (e.g.,
10 motor, powertrain, battery, tires, etc.), the current fuel supply, the manner in which the vehicle is traveling (e.g., velocity, acceleration, etc.), and the like.

Examples of environmental information inputs include, but are not limited to: the vehicle's current speed, the motor speed,
15 the vehicle's current orientation, the RPM of the vehicle's motor, wheel rotations per minute, the battery state, the voltage of the battery, the amp hours from the battery, the state of the battery, temperature of battery, the age of the battery, and the number of times the battery has charged and discharged, the tire pressure,
20 the drag force due to rolling resistance of the vehicle, the weight of vehicle, the amount of air going to the engine, the amount of gas going to engine, and the weight of driver.

As described above, some of the information inputs may be redundant, or may be derived from related information.
25 Furthermore, the power management system may use any of the sensors, gauges and detectors already present in the vehicle as

information inputs. For example, the velocity of the vehicle may be detected by a speedometer which may pass information on to the power management system. The power management device may also include additional sensors, inputs or detectors to determine or
5 derive any information about the operational status of the vehicle. For example, the power management device or system may include one or more weight sensors (to determine the load in the vehicle, including the driver's weight).

The examples of operational status information inputs are
10 only intended to illustrate the kinds of operational status information that may be used by the power management devices and systems described herein. Any appropriate information about the operational state of the vehicle may be provided to the power management device or used by the power management device.

15 Information from one or more command inputs may be used to determine the optimal power to apply to the vehicle. Command inputs generally include any instructions from the driver of the vehicle about the operation (or intended operation) of the vehicle. Command inputs may be directly input by the user, or they may be
20 derived by the actions of the driver or the identity of the driver.

Examples of command inputs include, but are not limited to: the acceleration applied by a driver, the braking applied by a driver, the vehicle's known or predicted final destination, the vehicle's known or predicted interim destination, preferred speed,
25 maximum and minimum range over which speed should be adjusted, and preferred route.

As with all of the information inputs, some of the command inputs may be redundant, or may be derived from related information. For example, a route destination may be input by the driver, or it may be inferred from the driving behavior and/or identity of the driver. The identity of the driver may also be input by the driver, or it may be inferred. For example, the identity of the driver may be matched to the weight of the driver. Command inputs may include any of the drivers actions to control the vehicle. For example, command inputs may include steering, breaking, shifting, or application of the accelerator. The power management device may include sensors, inputs or detectors to monitor the manipulations of the driver. In some variations, the driver may directly input commands to the power management system or to other devices in the vehicle that communicate these command to the power management system. For example, the driver may use an on-board navigational system to select a destination, and this destination may be communicated to the power management system. In some variations, the user may provide commands directly to the power management system. In some variations, the command inputs may be derived from other information, including the environmental information and the operational status information. For example, the destination (either a final or an intermediate destination) may be estimated based on the current location of the vehicle, the direction that the vehicle is traveling, the time of day and/or the driver of the vehicle (e.g., if it's 8:00 am, and driver X is

driving the car on interstate 280, then the final destination is most likely to the address of X's work place).

Information inputs, including command inputs, may have default or pre-set values. For example, the power management device or system may have a preset or default maximum and minimum range of speeds for traveling part of the route (e.g., if the maximum and minimum range has not been explicitly input, the maximum and minimum range may be set to +/- 4 mph). In some variations, the information inputs may include metadata describing one or more features of an information input. Metadata may include information about the information input. For example, metadata may indicate the last time a particular data input was updated, or may indicate that the data is a default setting, or the like.

These examples of command inputs are only intended to illustrate the kinds of command inputs that may be used by the power management devices and systems described herein. Any appropriate command input may be provided to the power management device or used by the power management device.

Information from one or more operational parameters of the vehicle may be used to determine the optimal power to apply to the vehicle. Operational parameters generally include information about characteristics that are specific to the vehicle (e.g., characteristics of component parts of the vehicle, including the battery, the engine, the powertrain, the tires, etc.). Operational parameters of the vehicle may be stored and retrieved from a memory

that is part of the power management device or system, or they may be retrieved from a remote information source.

Examples of operational parameters include, but are not limited to: aerodynamic parameters (CDA), rolling resistance parameters (Crr1 and Crr2), drive train efficiency parameters, motor efficiency parameters, and battery model parameters, battery charge and discharge relationships, type of battery.

The operational parameters may be fixed (e.g., may not vary with operation of the vehicle), or they may be changed. In some variations, the operational parameters may comprise a database (e.g., a lookup table), so that the value of the operational parameter may depend upon another information input, and may be retrieved from the database by using one or more information inputs as a search key. In some variations, the operational parameter may comprise an equation or relationship that has other information inputs as variables.

Examples of operational parameters are provided below. In general, operational parameters may be determined experimentally (e.g., by testing) or may be provided by product manufacturers. In some variations, general (or generic) operation parameters may be used if more specific parameters are not available. For example, battery charge and discharge graphs (showing operational characteristics of the battery) can be obtained from battery manufacturers. Operational parameters for various types of batteries (e.g., Lithium polymer batteries, etc.) can include material characteristics, energy densities, power densities,

thermal characteristics, cycle life, charge and discharge characteristics (e.g., voltage over time), and current flux over time. For example, FIGS. 12A and 12B show exemplary charge and discharge characteristics for one type of Lithium polymer battery (e.g., the Li-Po 40Ah from Leclanche SA, Switzerland). Complete characterization may also be made by taking charge and discharge measurements from either a specific battery, or a specific model and make of a battery.

Motor efficiency data may be obtainable from the manufacturer. A full model dynamometer testing may also be used to determine motor characteristics. For example, FIGS. 13A and 13B show some examples of motor characteristics that may be provided. Aerodynamic parameters of the vehicle (e.g., the outer chassis) can also be provided by the auto manufacturer, or could be measured (e.g., in a wind tunnel). Aerodynamic properties may also be estimated or calculated for different vehicles (or vehicle shapes, makes, or models) using literature values. Examples of aerodynamic parameters may be found, for example in "GM Sunraycer Case History/M-101" (Published by the Society for Automotive Engineers, Inc, December 1, 1990), The Leading Edge: Aerodynamic Design of Ultra-Streamlined Land Vehicles (Engineering and Performance) by Goro Tamai (Robert Bentley, Inc, 1999), and The Winning Solar Car: A Design Guide for Solar Race Car Teams by Douglas R. Carroll (SAE International, 2003), each of which is herein incorporated by reference in its entirety. Examples of drag coefficients are also readily available (e.g., online :

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<http://www.answers.com/topic/drag-coefficient-1>, last visited October 12, 2005).

Rolling resistance parameters may also be provided by the tire manufacturer, or may be measured. An example of one variation of a published rolling resistance formula may be found in "Fahrwerktechnik: Reifen und Raeder" by Jörnsten Reimpell and Peter Sponagel (published by Vogel-Fachbuch Technik, ISBN 3-8023-0737-2, 1988), herein incorporated by reference in its entirety. Similarly, a drivetrain efficiency model may be provided by the vehicle manufacturer, or may be measured from the power input vs. the power output for the entire drivetrain. In some variations, (e.g., some variations of solar cars, for example) do not have a drivetrain, since the motor is built directly into the wheel.

Examples of operational parameters are only intended to illustrate the kinds of operational parameters of the vehicle that may be used by the power management devices and systems described herein. Any appropriate operational parameter may be provided to the power management device or used by the power management device.

The information inputs described herein may be used to determine the optimally efficient energy to supply to the engine.

Optimization of Engine Efficiency

FIG. 2 illustrates some of the steps that may be followed to optimize the energy supplied to an engine so that the vehicle travels at a fuel-efficient speed. To determine an optimally efficient speed (or the optimal power to be supplied to the

engine), a route is determined 201 from the starting position and an actual or estimated ending position, the route is segmented 203 into one or more segments, a model optimal speed (or power) is calculated 205, statistical data from previous trips along the same segment of the route are retrieved 207, and an overall efficiency applied power is calculated from at least the model power and the statistical data 209. Finally, the overall efficient applied power is provided to the engine. In some variations, the vehicle operator may be notified of the overall efficient applied power instead of (or in addition to) automatically applying this optimal power. Each of these steps is described more fully below. The statistical data from previous trips may be an optional element. For instance, one may choose not the use statistical data or one may not have statistical data.

1. Determine route

The route is determined based on the current position of the vehicle and a final destination position. The destination position may be explicitly provided by the operator of the vehicle (e.g., as an operator input), or it may be derived. In some variations, the operator may provide a destination directly to the power management device, or to a device that communicates with the power management system (e.g., an on-board navigation system, etc.). The operator may also select the preferred route to the final destination either before beginning the trip, or after beginning the trip. For example, the operator may choose a

destination using a navigation system including navigation systems that are not part of the power management device (such as any commercially available GPS navigation systems), which may also generate a route. The GPS navigation system may communicate the destination and route information to the power management device. In some variations, the power management system includes a GPS component or module, and may at least partly act as a navigation system.

The destination may be derived from information about the operator, the current location, the time of day, or the like. The power management device may include statistical destination logic that determines one (or more) most likely destinations based on information provided from environmental inputs, user command inputs, and vehicle operational status inputs. In some variations, the destination is derived by generating a series of statistically weighted (e.g., likely) destinations based on any, all, or some of these inputs. Examples of some of the inputs that may be used by the statistical destination logic to determine a likely destination may include, but are not limited to: the weight of the driver, the time of the day, the current location of the vehicle, the direction that the vehicle is facing (or traveling in), the day of the week, and the speed of the vehicle.

The statistical destination logic may identify one or more destinations based on information held in a memory. For example, the statistical destination logic may use any of the information inputs to select among a record of destinations to

which the vehicle has previously driven. These destinations may be assigned a probability weighting based on the information inputs. For example, the statistical destination logic may continuously infer the vehicle's destination. The information inputs can be used to assign a probability to a particular destination. It is important to note that the word "destination" in this context is not necessarily the driver's final destination. It may be an intermediate destination along the route that the statistical destination logic determines has a greater chance than some threshold likelihood (e.g., X%) of being the destination. A threshold likelihood may be preset, and may be varied by the user or by the power management device.

For instance, if a driver leaves her house to go to work, and drives toward the highway, the statistical destination logic may determine that there is a 95% chance that she is going to the highway but only a 75% chance that she is going to go South on the highway. So, if the threshold (X) is 90%, the "destination" in this case would be the highway onramp. Once she gets on the highway going south, the probability that she is going to work may have increased to 92%. Now, the "destination" would be her work. Thus, as the vehicle drives around, the probable destination determined by the statistical destination logic may constantly change to revise the destination or intermediate destination.

In some variations, the statistical destination logic accesses (and may also write to) a memory comprising past destinations that are correlated to some or all of the information

inputs (such as location, driver weight, time of day, day of week, direction, velocity, etc.), and/or information derived from these inputs (e.g., driver identity, driving habits, etc.). The list of possible locations may be weighted by the statistical destination logic based on how closely the information inputs correspond to the associated information inputs for these destinations, and may be influenced or refined by the number of times that the driver has driven to this destination. Some of the information inputs (or some combination of the information inputs) may be weighted more heavily than others in determining the likelihood of a destination. Furthermore, the statistical destination logic may select more than one likely destination, including selecting a final destination and one or more intermediate destinations.

One variation of a procedure for determining the most likely destination is described below, and illustrated in FIG. 3B. For example, the schematic route shown in FIG. 3A has 10 junctions (A to J). The probability that a driver will take any particular route from the start position may be described as "P". Thus, Pold is the previous (or old) percentage likelihood of taking a route, whereas P is the newly calculated percentage likelihood. Pold is initially set to 1 because there is a 100% likelihood that your route will go through the place that you are currently at. As used in this example, an intersection is as a junction having more than one choice of direction that you may go in. Examples include highway exits (e.g., you can stay on the highway or take the exit), a four-way stop, and a fork in the road.

Referring now to FIG. 3A, assume that you have taken the following trips:

1. start. → A → C → E
2. start → A → C → D → F
- 5 3. start → A → G → I
4. start → A → G → I
5. start → A → C
6. start → A → C → E
7. start → A → C → E
- 10 8. start → A → G → J → C → E
9. start → A → C → E
10. start → A → C → D → F

Based on this trip history, the probably of your taking moving from any junction in the route shown in FIG. 3A can be determined based on this trip history. These probabilities are tabulated in the table:

Position	Probably of continuing in the possible directions	Probably of going through each location based on past behavior
start	10/10 A	
A	7/10 C 3/10 G 0/10 B	A: 10/10 = 100%
B	0/0	B: 0/0 = 0%

C	2/8 D 5/8 E 1/8 end	C: $(10/10) * (7/10)$ + $(10/10) * (3/10) * (1/3) * (1/1) = 71\%$
D	2/2 F	D: $(.71) * (2/8) = 17.75\%$
E	5/5 end	E: $(.71) * (5/8) = 44.375\%$
F	2/2 end	F: $(.1775) * (2/2) = 17.75\%$
G	2/3 I 1/3 J	G: $(10/10) * (3/10) = 30\%$
H	0/0	H: $0/0 = 0\%$
I	2/2 end	I: $(.30) * (2/3) = 20\%$
J	1/1 C	J: $(.30) * (1/3) = 10\%$

The Table also shows the probably of going through each location based on my previous driving behavior in the next trip. For a new trip, at each junction, the probabilities may be recalculated. For example (on the same trip), once you have reached point A and decided to turn toward C, the new probabilities are recalculated as: A: 0%, B: 0%, C: 100%, D: 25%, E: 62.5%, F: 25%, G: 0%, H: 0%, I: 0%, J: 0%. In real world examples, it could take hundreds of drives before the statistics become useful at predicting where the driver is likely to go. FIG. 3B illustrates one variation of a statistical destination logic that may be used.

2. Segment route

The route used by the power management device typically includes a starting position (e.g., the current position of the vehicle, which may be indicated by GPS), an ending position, as described above, and any intermediate positions between the initial and the final positions. In some variations, the route may be broken up into segments that may be used by a power management device to optimize the power needed to travel this segment. A segment may comprise any distance to be traveled, including the entire route, or small portions of the route. Different segments in the same route may be of different lengths.

The route may be segmented in any appropriate manner. For example, the route may be broken into segments based on predetermined or anticipated changes in speed (e.g., switching from 65 to 55 mph), changing traffic patterns (e.g., turns, stops, yields, etc.), traffic or anticipated traffic, distance (e.g., x miles), terrain (e.g., the gradient or condition of a road), or the like. In some variations, the route may be segmented based on a combination of such factors.

A route may be entirely segmented, or only partially segmented. For example, the power management device may segment only the first part of the route (e.g., the portion containing the current position of the vehicle), or the first few segments. This may be particularly useful when the destination is an anticipated destination determined by the statistical destination logic, for example. The route may be continuously re-segmented. For example,

as the vehicle moves, the power management device may become aware of changing road conditions (e.g., traffic, weather, etc.), or the user may change the route, necessitating re-segmenting. As used herein, "continuously" may mean repeated multiple times, including
5 repeating regularly or periodically.

In some variations, the entire route (or the entire predicted route) may be divided up into N segments. The number (N) of segments may be fixed or may depend upon the route. The more segments that the route is split into, the more accurate the model
10 may be. However, more segments may also require more computing power. Thus, the number of segments N may be decided based on the tradeoff between computing power and accuracy.

3. Calculated energy for the route

15 The power required by the vehicle to travel along a route, or a segment of the route, may be estimated or calculated, and this calculation may be used to determine a calculated speed for the vehicle so that the power usage is optimized or minimized. Such calculations of power requirements at different speeds
20 typically use information inputs from the vehicle, the user, and the environment over the route from the initial position to a destination (e.g., a final destination or an intermediate destination). Any appropriate information input may be used.

Simulation of the power requirement of the vehicle may
25 estimate power requirements at different speeds. Thus, the speed(s) that the vehicle travels the route (or a segment of the

route) can be optimized. For example, the simulation could determine the most energy efficient speed for the vehicle to travel over one or more segments by minimizing the power requirement for the vehicle while allowing the speed to vary within the range of acceptable speeds.

In some variations, the power management device includes simulated energy requirement logic that determines the power requirement given the information inputs (e.g., information from the external environment of the vehicle, the operational status of the vehicle, information from one or more command inputs, and operational parameters of the vehicle). The simulated energy requirement logic can calculate the required applied power for the vehicle by calculating different power requirements for all or a portion of the route (e.g., the first segment) when the speed of the vehicle is within the range of speeds acceptable for traveling this section of the route. For example, if the target speed for a portion of the route is 60 mph with a range of +/- 5 mph, the simulated energy requirement logic may determine the speed at which the energy requirement is lowest that is closest to the desired speed (60 mph). Any appropriate method of calculating and/or optimizing this velocity may be used, including iteratively simulating different speeds within the target range.

The optimal speed may be calculated by energy calculation logic. A simplified example is provided below, using the following parameters, assuming an electric car with regenerative brakes.

	mass of the vehicle and the driver (m)	4000 kg
	CdA of the car	.25
5	The rolling resistance coefficients: Crr1 Crr2	.01 .05
	Drivetrain efficiency (eff)	80%
10	air density (rho)	1.3 kg/m ³
	acceleration due to gravity (g)	9.8 m/s ²
	number of wheels (n)	4
15	headwind velocity (vhw)	10 kph or 2.78 m/s

In this example, the route may be split into five segments of 5 km each with the following altitudes measured at the end of each segment: 0 (beginning of segment 1), 200 m (end of 1), 100 m (end of 2), 400 m (end of 3), 100 m (end of 4), 0 (end of 5). We may also make the simplifying assumption that the road grade is constant between measured points, and the road grades are calculated to be: +0.04 (seg 1), -0.02 (seg 2), +0.06 (seg 3), -0.06 (seg 4), -0.02 (seg 5). The target average speed is 100 kph.

For the sake of simplicity in this example, we can then calculate the amount of energy required to drive at a constant 100 kph speed for the entire route, as well as for 16 other combinations of the speeds 95 kph (26.39 mps), 100 kph (27.78 mps),

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and 105 kph (29.17 mps). In practice, this simulation may be run for hundreds or even thousands of combinations of speeds which may be tested to find the optimal speed to drive each segment. It is assumed that we enter the first segment traveling 100 kph (27.78 mps). It is also assumed that the speed listed for the segment is the final speed of the segment and the vehicle accelerates linearly throughout the segment.

The Table below shows the results of the energy calculation for all of the combinations tried. The lowest energy usage is 4275.94 Watt-hours. This was obtained by going 95 kph (seg1), 105 kph (seg2), 95 kph (seg3), 105 kph (seg4), 100 kph (seg5). The average speed over all 5 segments is still 100 kph, but the energy used is 10.2% less.

iterations	seg 1	seg 2	seg 3	seg 4	seg 5	Energy	units
1	27.78	27.78	27.78	27.78	27.78	4763.2484	Whr
2	26.39	29.17	27.78	27.78	27.78	4536.889	Whr
3	26.39	29.17	26.39	29.17	27.78	4275.938	Whr
4	26.39	29.17	26.39	27.78	29.17	4382.5026	Whr
5	26.39	29.17	27.78	26.39	29.17	4950.1438	Whr
6	26.39	29.17	27.78	29.17	26.39	4438.3467	Whr
7	26.39	26.39	29.17	29.17	27.78	4942.6325	Whr
8	26.39	26.39	29.17	27.78	29.17	5055.9124	Whr
9	26.39	26.39	27.78	29.17	29.17	4784.1865	Whr
10	29.17	26.39	27.78	27.78	27.78	5013.2565	Whr
11	29.17	26.39	26.39	29.17	27.78	4745.585	Whr
12	29.17	26.39	26.39	27.78	29.17	4852.1495	Whr

13	29.17	26.39	27.78	26.39	29.17	5137.6625	Whr
14	29.17	26.39	27.78	29.17	26.39	4914.7142	Whr
15	29.17	29.17	26.39	26.39	27.78	4602.8845	Whr
16	29.17	29.17	26.39	27.78	26.39	4493.3028	Whr
17	29.17	29.17	27.78	26.39	26.39	4765.4617	Whr

In general, any appropriate relationship between the information inputs, the speed (e.g., the applied power) and the required energy may be used to determine an optimized speed. In some variations, the energy requirement may be calculated from aerodynamic information, rolling resistance, potential energy change due to road gradient and acceleration. FIGS. 4A, B show one method of determining the target speeds for a route by an iterative method. One variation of a method for determining target speeds is described by the equation:

$$E = \frac{V_{iarn}}{eff} \left(CdA \frac{\rho}{2} (V_{iarn} + V_{hw})^2 + (mgC_{rr1} + nV_{iarn}C_{rr2}) \cos(\tan^{-1}(G)) + mg \sin(\tan^{-1}(G)) + ma \right)$$

where E is the total energy used over the segment. The terms of the equation include:

$$\frac{V_{iarn}}{eff}$$

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where V_{tarn} = target velocity over time, and eff is the efficiency of the powertrain.

The terms inside of the parenthesis calculates the total drag force on the vehicle. However, we want to calculate the total amount of energy. In general, Power = Force * Velocity, and Energy = Power * time = Force * Velocity * Time. The total amount of energy used is increased based on the power lost due to the inefficient powertrain.

The drag force due to the aerodynamics of the car is expressed as:

$$CdA \frac{\rho}{2} (V_{tarn} + V_{hw})^2$$

where CdA is the coefficient of drag time area (which can be a measured value), and rho (ρ) is the density of air, V_{tarn} is the target velocity in the nth iteration, and V_{hw} is the headwind velocity. The drag force due to the rolling resistance of the tires is expressed as:

$$(mgC_{rr1} + nV_{tarn}C_{rr2})\cos(\tan^{-1}(G))$$

where m is the mass of the car, g is the acceleration due to gravity, n is the number of wheels, V_{tarn} is the target velocity in the nth iteration, C_{rr1} and C_{rr2} are the coefficients of rolling resistance, and G is the grade of the road. The coefficients of rolling resistance may be measured values or they may be values

supplied by tire manufacturer (e.g., tire manufacturer). The numbers may vary for different road surfaces as well.

The force due to the road gradient is:

5 $mg \sin(\tan^{-1}(G))$

where m is the mass of the car, g is the gravitational constant, and G is the grade of the road. The force due to the acceleration of the car is ma (the mass of the car times the acceleration over the segment, assuming linear acceleration for the segment).

10 Putting everything together, the equation can be solved for E, the total energy used over the segment. Similar equation are described for calculating the total energy used over a segment in "The Speed of Light, The 1996 World Solar Challenge" by Roche, Schinckel, Storey, Humphris, and Guelden (UNSW, 1997), herein
15 incorporated by reference in its entirety.

FIGS. 4A, B describe a method of calculating an array of optimized velocities for an entire route that has been broken up into segments. In some variations, only one or a subset of optimized speeds are calculated.

20 Variations on the above equations may be made to simplify the relationships or to include additional factors. For example, the speed varying part of the rolling resistance equation may be removed to simplify the equation to:

$mgC_{rr}\cos(\tan^{-1}(G)).$

25 Additional factors could be added as well, for example, by including the variation of the motortrain efficiency with speed,

or by including the variations of the CdA depending on the directionality of the wind.

4. Historical route information

5 The power management device may refer to a record of historical route information. For example, the power management device may include a memory or a data structure that holds information on routes or segments or routes that the vehicle has previously traveled. The memory may comprise a database, a
10 register, or the like. In some variations, a power management system communicates with a memory or other data structure that is located remotely. The record of historical route information may include the route information (e.g., starting location and any intermediate locations), as well as information about the actual or
15 optimized velocities and/or applied power for the vehicle traveling the route. The record of historical route information may also include any informational from information inputs (described below). For example, the record of historical route information may include information about the time of day, weather conditions,
20 road conditions, driver, etc. Multiple records for the same route (or segments of a route) may be included as part of the record of historical route information.

 The record of historical route information may provide statistical information on driving habits. The driving habits of
25 an operator over a particular route or segment of a route may be determined by analyzing the previous times that the driver has

taken this route, and by looking at the efficiency (e.g., the power efficiency) for each previous trip, and for the combination of previous trips. Thus, the historical route information may be analyzed by statistical route analysis logic that can determine a
5 probable optimal speed at each point along a route (e.g., at segments along the route). The more times that a driver has driven the route, the more data can be used to estimate a probable optimal speed for all or part of the route.

Historical data may be particularly useful when there is
10 a large amount of such data available. Instead of trying to calculate the predicted power usage based on physics modeling, this method merely looks at all of the previous data to determine the power that would be utilized to drive each segment at a particular speed. For example, in the past, a driver may have driven a
15 particular segment 1000 times. Out of those thousand times, she may have driven it at speeds ranging from 80 kph to 120 kph. For each of those 1000 times that she drove the segment, the car recorded how fast she drove it, and how much energy was used. Therefore, to estimate how much energy would be required to drive
20 the segment at 95 kph, the power may be estimated by taking an average of all of the previous times the driver drove that segment at 95 kph to arrive at an estimated energy usage, rather than calculating the power from the physics calculations, as described above. In one variation, only the previous trips along the segment
25 made under approximately similar conditions are considered (e.g., similar cargo weight, headwinds, etc.).

FIG. 5 describes one method of using historical data to determine a Probable Optimal Speed. This speed most likely approximates the optimal speed, based on previous trips. In general, this method is most accurate when there are many similar previous trips to be in the database. FIG. 5 shows that, the location of the vehicle is periodically determined (e.g., via GPS, manual entry, etc.), and this location can then be used to determine a historical segment corresponding to the current location. As described above, every route may be divided into a finite number of segments, and the more segments that the route is split into, the more accurate the algorithms may be. However, additional segments also increase the computing power needed. The destination is also determined periodically (e.g. as the vehicle is moving), and is reevaluated based on the current location. It can then be determined if the vehicle is in the same segment as previously determined or if it has entered a new segment since reevaluating the vehicle location. If the answer is "yes," then nothing needs to be done until the next time the location is measured. If the answer is "no," then the database is examined to find the historical information about this segment. For example, the historical information is queried to determine what speed the vehicle was traveling every time that the vehicle (or the specific driver of the vehicle) was in the same segment going to the predicted destination. In particular, the historical information is queried to determine how fast the vehicle was traveling during the trip in which the vehicle used the least

amount of energy over the same route. The result of this query gives a speed that is most likely the best (e.g., most efficient) speed to travel for the current trip. The process can iteratively repeat for the next location measurement as the vehicle continues.

5 FIG. 5 describes a method of determining a probable optimal speed using historical route information. In FIG. 5, the probable optimal speed is identified from the historical route information as the most efficient speed (e.g., the speed having the lowest energy requirement) used by the vehicle when traversing the
10 segment, when that segment is part of a route having the same destination as the current destination. The flowchart shown in FIG. 5 illustrates a continuous process, in which the power management device can determine a probable optimal speed as the current segment changes (e.g., as the vehicle moves).

15 In some variations, probable optimal speeds may be identified for the entire route. For example, the predicted or actual route may be segmented, and an array of probable optimal speeds may be identified from the historical route information for each segment. In some variations, the probable optimal speed is
20 not a single most efficient speed for a segment of a route, but is derived from a combination (e.g., an average, median, weighted average, etc.) of all or a subset of the historical route information speeds. In some variation, only a subset of the historical route information is used. For example the probable
25 optimal speed may be driver specific, so that only information for a specific driver is used to calculate a probable optimal speed.

Drivers may be identified by bodyweight, or some other information input, including self-identification. If there is no historical route information for the segment or route being examined, then the probable optimal speed may be set to a predetermined value (e.g., zero), or some other indicator may be toggled so that the probable optimal speed is not relied upon.

In one variation, a reliability estimate may be assigned to the probable optimal speed. For example, a reliability estimate may be related to the number of data points (e.g., the number of times that the vehicle (or a driver driving the vehicle) has driven that segment or route. For example, if there are no records of the vehicle driving the route, the reliability estimate may be set very low. Generally, the more records for a route in the historical route information, or the more closely the identifying information in the record matches the information about the current route (e.g., the driver, weather conditions, traffic, etc.), the higher the setting of the reliability estimate.

5. Calculation of an efficient speed output

Finally, an efficient speed for the vehicle to travel the route (or a part of the route) may be determined from the calculated optimized speed and the probable optimal speed. The optimum speed is the most efficient speed (E), as described above. This efficient speed (or efficient speed output of the power management system) may also be expressed as the applied power that is provided to the engine to achieve the speed at which the fuel

efficiency is optimal. Thus, an efficient speed is typically a function of the driver's current operational demands, the current operational conditions of the vehicle, the operational parameters for the vehicle, and any historical behavior of the vehicle taking
5 the same (or a similar) route.

In general, an efficient speed output is determined by a combination of the calculated optimized speed and the probable optimized speed after they have been appropriately weighted. In some variations, this weighting takes into account the total energy
10 predicted by the calculated optimized speed (e.g., by the simulated energy requirement logic) and the total energy required for the route predicted by the probable optimized speed (e.g., by the statistical route analysis logic). The reliability estimate for the probable optimized speed may also contribute to the weighting.
15 The power management device may include derived efficient speed logic that can determine efficient speeds for the vehicle to travel the route, or a portion of the route. In some variations, the efficient speeds are expressed as power or energy to be applied to the vehicle engine (e.g., the applied power).

20 As previously mentioned, the methods and logic described above may be used to calculate a speed or an applied power for running the vehicle at an optimal fuel efficiency. As will be apparent to one of skill in the art, the same procedures may be used to determine a speed (or speeds) over the route that minimize
25 or maximize other factors, and are not limited to optimizing only fuel efficiency. For example, the power management device may

control the speed of the vehicle so as to minimize the duration of the trip instead of (or in addition to) fuel efficiency. Thus, the simulated energy requirement logic may be expressed as a simulated time requirement, and may calculate the time required to travel a segment of the route as a function of the speed or energy, and additional information input. In this case, calculated optimized speeds may be determined by minimizing the duration of the trip over each segment. Furthermore, the probable optimal speed may be determined from the historical route information based on the duration of travel, rather than the power applied, for each segment.

Control Logic

The power management device may include control logic for controlling the operation of the power management device. Control logic may include logic for acquiring information inputs, communicating with different components of the power management system, estimating the destination of the vehicle from information inputs, segmenting the route into segments, simulating the energy requirements of the engine from information inputs, and controlling the entire power management device or system.

For example, the power management device or system may include polling logic for acquiring information inputs and may also coordinate writing of information from the power management device to a memory. In some variations, the polling logic polls sources of information data that are provided to the power management

device. For example, the polling logic may poll data from sensors, inputs, memories, or any other source of information data. The polling logic may further coordinate storing of this data in a memory, such as a memory register or a memory device or database
5 that may be accessed by the power management device or system. In some variations, the polling logic causes old data (e.g., greater than x weeks old) to be overwritten. The polling logic may also control how often the various information data sources are polled. For example, the polling logic may continuously poll data from
10 external environmental sensors (e.g., detecting location, direction, elevation, traffic, weather, etc.) and operational status detectors (e.g., detecting vehicle speed, wheel velocity, motor speed, etc.). The polling logic may also coordinate writing of route information. For example, the polling logic may
15 coordinate recording the decisions made at intersections, and information about routes traveled by the vehicle, and the like. In some variations, the polling logic also coordinates the writing of information derived from the information inputs to a memory. For example, the polling logic may coordinate recording the optimal
20 speed or energy used to traverse a segment or other portion of a route.

As described above, the power management device or system may also include statistical destination logic. Statistical destination logic may infer one or more likely destinations based
25 on the information inputs. For example, the power management system may infer the destination of the route based on the current

location and direction of the vehicle, and the date and time of day. In some variations, the power management system is unable to infer a final destination, but it can generate an intermediate destination or segment for the route, as described above. The
5 probable destination(s) identified by the statistical destination logic may then be used to optimize the power needed to travel the route or a segment of the route, and to determine a historical probable optimal speed.

In some variations, the power management device or system
10 includes simulated energy requirement logic and statistical route analysis logic. As described above, simulated energy requirement logic may determine a calculated optimized speed for the vehicle, and statistical route analysis logic may be used to determine a probable optimal speed. The power management device or system may
15 also include derived efficient speed logic that determines the most efficient speed or power to be applied to the vehicle engine, as described above.

Power management logic can coordinate different components of the power management system, including the logic
20 components, user interfaces, informational data inputs, memory, processors, motor control mechanisms, and the like. Thus, the power management system may include power management logic to control the overall activity of the power management system.. FIG. 6 shows a graphical representation of one variation of the power
25 management device, indicating that the power management logic controls and coordinates the various components of the system. In

FIG. 6, the polling logic 607 coordinates the activity of information inputs 601, 603, 605. The information inputs are also linked to each other and to the statistical destination logic 609, statistical route analysis logic 611, and simulated energy requirement logic 613. In particular, these elements are all connected to the memory, and may read and write to this memory. The derived efficient speed logic also controls these three logic elements 609, 611, and 613. As described above, the derived efficient speed logic 615 may produce an efficient speed output for each part of the route (e.g., the speeds or applied powers resulting from optimizing the fuel efficiency over the route or parts of the route). Before this applied power can be used to control the motor (via a motor control mechanism 619), the power management logic may check for overrides such as operator overrides (e.g., breaking), or other overrides that may be indicated by the headway cruise control box 617. For example, the operator may override the power management device by applying the brakes, etc. The power management device may also be preempted by an obstruction (such as another vehicle) in the "headway" that blocks the vehicle, requiring the vehicle to slow or stop.

FIG. 6 shows one variation of the power management device described herein. As will be apparent to those of skill in the art, different variations are possible. For example, additional components (e.g., communications elements, microprocessors, memories, etc.), and/or additional logic (e.g., route segmentation logic, operator interface logic, etc.) may also be included. In

some variations, some of the elements may be omitted (e.g., the separate polling logic), or may be combined with other elements. In some variations, the organization of the elements may be different. For example, the statistical destination logic may be controlled by the polling logic, rather than the derived efficient speed logic.

Power Management Devices

In general, the power management device comprises power management logic that receives information input about the external environment of the vehicle, the operational status of the vehicle, one or more command inputs from the driver, and one or more operational parameters of the vehicle. The power management device may also include additional components such as information inputs (e.g., sensors, detectors, relays, etc.), one or more processors (e.g., microprocessors), memories (e.g., databases, ROM, RAM, EPROM, etc.), communications devices (e.g., wireless connections), user interfaces (e.g., screens, control panels, etc.), and/or motor control mechanisms. In some variations, the power management device may be installed into the vehicle by the vehicle manufacturer. In other variations, the power management device may be retrofitted into a vehicle. In general, the power management device or system intervenes between the driver and the engine. In practice, the power management system may be physically located in any appropriate location in the vehicle. FIG. 7 shows one example of a vehicle having a power management system 701 as described

herein. In FIG. 7, the power management system is shown in the front of the car 700, connecting the motors 705 and batteries 707.

Any appropriate sensors, detectors or data inputs may be used with the power management devices and systems described herein. For example, sensors for detecting external environmental information may be used (e.g., optical, mechanical, electrical, or magnetic sensors). Sensors may be monitored (e.g., polled) in real-time, as described above. For example, polling logic may coordinate continuous or periodic polling of Global Positioning System (GPS) information (e.g., giving information on the vehicle's current location, current elevation, upcoming elevations, upcoming terrain, vehicle's destination, etc.), speedometer information (e.g., vehicle's current speed, motor speed), date and time information (e.g., the date and time may be used to determine personal driving habits and sun angle), gyroscope information (e.g., vehicle's current orientation, current slope/grade of road), RPM (e.g., motor and wheel rotations per minute), accelerator and brake pedal position (e.g., pressure applied and/or current angle of the pedals), the angle of sun (e.g., sensors may detect latitude, longitude, time of day, date), weather (e.g., wind direction and velocity, rain, sun, snow, etc.), battery state (e.g., voltage, amp hour meter, etc.), tire pressure (e.g., may be used to calculate the drag force due to rolling resistance), headway control information (e.g., the distance from a car in front of the vehicle), the weight of car (e.g., weight of cargo, passengers, driver), airflow (e.g., the amount of air going to the

engine), gas flow sensor (e.g., the amount of gas going to engine of a hybrid or ICE car), weight of driver (e.g., may be used identify the driver and linked to personal driving habits). Different detectors or sensors may be polled at different intervals, including continuously, or only occasionally. Polling may also depend upon the availability of a resource. For example, information may be available only when a telecommunications network (e.g., satellite, cellular, etc.) is available.

In some variations, a memory may be used. The memory may be read/write memory, or read only memory. The memory may include information, such as information on the operational parameters of the vehicle related to the make and model of the vehicle. As described above, operational parameters may include look up tables, charts, or the like. For example, a memory may include information about an aerodynamic model (CDA) for the vehicle, a rolling resistance model (Crr1 and Crr2), a drive train efficiency model, a motor efficiency model, and/or a battery model (e.g., charge and discharge graphs for the battery). In some variations, these models are not part of a memory, but are algorithms or logic.

Any appropriate memory may be used, including ROM, RAM, removable memories (e.g., flash memory), erasable memories (e.g., EPROM), digital media (e.g., tape media, disk media, optical media), or the like. In some variations, the memory may comprise a database for holding any of the route information (including historical route information), about the segments traveled, the speeds traveled, energy usage measured or calculated for this route

or segment, who the driver was, external environmental conditions while driving the route, operational status of the vehicle while driving the route, and command inputs while driving the route. The power management system may include more than one memory.

5 The power management system may also include one or more user interfaces. A user interface may allow input of user command information (e.g., selecting a destination, selecting a route, selecting a target speed or speeds, selecting a range of acceptable speeds, etc.). In some variations, a user interface may also
10 provide output from the power management system that can be viewed by the user. For example, the user interface may provide visual or auditory output, or suggest target speeds that the user can match to optimize power supplied to the vehicle. In some variations the user interface may provide status information to the user about the
15 power management system. For example, the user interface may indicate that the power management system is engaged, what the destination (or predicted destination) is, what the optimal speed (or speeds) is, what inputs are missing or estimated, or the like. In some variations, the user interface may display any of the
20 information inputs.

FIG. 8 shows one variation of a user interface for a power management device or system. In FIG. 8, the user interface 800 includes a screen region 801, that shows a two-dimensional map indicating at least part of the route 805 and the direction of
25 travel 803, the temperature of the external environment 807, the weather 809 (indicated by an icon), the current or derived

efficient speed 811, the set (or cruising) speed 813, and the range within which the speed should be maintained 815. The screen region of the user interface shown in FIG. 8 also shows the destination 819.

5 In some variations, the user interface of the power management system may include multiple screens for displaying information, or for accepting user input. In FIG. 8, the user interface also includes a plurality of buttons 821, including a toggle 823 allowing menu-driven interaction. The user interface
10 may also include messaging features. For example, when the vehicle is turned on but stopped, a user interface may indicate a message has been sent/received (e.g., by flashing, etc.). When the user presses a "Messages" button, the system may display feedback messages. For example, if the tire pressure sensor notices that
15 the tire pressure is low, a message to that effect will be displayed to the user. Diagnostic/test messages can also be sent to this screen for testing, development, or repair purposes. The messaging features may be included on the face of the user interface (e.g., as a "Messages" button 821, etc.).

20 FIG. 9 illustrates the flow of information in one variation of a power management system. Information inputs into the power management system 901, 903, 905 enter the system and some (or all of them) may be displayed by the user interface. For example, external information inputs 901 may be shown. The status
25 of some of the information inputs (or the status of the detectors that receive the information inputs) may also be shown. For

example, the user interface can indicate when the system is connected to an external information input. In some variations, the external information inputs may be connected to the power management system by a wireless transmission (e.g., from an external source), and the connection to the external source may be indicated by the user interface. As described above, the user interface may accept command inputs from the driver (or a passenger) 905. In some variations, user commands may be accepted directly by using buttons on the user interface, or by voice commands. In other variations, at least some of the user commands may be entered into the power management system from another source (e.g., a separate cruise control or GPS device). Finally, the user interface may indicate the output of the power management device or system 909, typically an efficient speed output for the engine.

In some variations, the power management system may include a headway cruise control. The headway cruise control can prevent collisions when the vehicle is in motion by overriding the power management control system's control of the vehicle speed. In some variations, the headway cruise control detects the proximity of other vehicles or obstacles in the road ahead. The headway cruise control may include sensors on the vehicle, such as laser, ultrasound or other electronic distance measurement devices. Increasingly, more vehicles are including some sort of GPS interface to communicate with other vehicles to determine distance between the vehicles to avoid collisions.

The power management devices and systems described herein may also include a motor control mechanism. The motor/engine controller changes the motor speed by mechanical operations such as pulling on a cable to adjust gas/airflow mixture or by electrical means with either analog or digital inputs by the driver. With electric driven motors, a variable may be changed to increase or decrease motor speed. In the cruise control settings, the speed of the motor may change based algorithm in the processor.

The power management devices and systems described herein may be organized in any appropriate manner, as described above. For example, in some variations, the power management device described herein may include component parts that are connected as illustrated in FIG. 10. FIG. 10 shows a schematic of one variation of a power management device. In FIG. 10, the power management system includes a central processor 1001 (CPU) that can execute control logic such as power management control logic, statistical destination logic, simulated energy requirement logic, statistical route analysis logic, derived efficient speed logic, polling logic, etc. This CPU receives inputs from sensors 1005, GPS receiver 1007, a clock 1011, a telemetry data receiver 1009, a speech recognition processor 1021 (including a microphone 1019, 1025), user interface buttons 1039, 1037, and memory components (including RAM 1035, a long-term memory 1033, firmware ROM 1031, and a removable memory 1029, 1041). The CPU may also coordinate output through the LCD display 1015, 1017, a speaker 1023, 1027, and the motor control mechanism (motor controller) 1043. In some

variations, the sensors 1045 may also be included as part of the power management devices or systems.

As described above, the power management system may also be used with a telemetry system. Thus, the power management system may communicate with one or more external components. For example, the power management system may store information in a remote memory. The power management system may also contribute to a database of information about route, road conditions, and the like, such as a database of historical route information. In some variations, the motor control system may remotely communicate with a processor, so that at least some of the control logic is applied remotely.

FIG. 11 shows a schematic illustrating the use of telemetry by the motor control system. In FIG. 11, a power management device 1101 communicates by wireless communication with a database 1107 through a transmitter/receiver 1105 (shown as a satellite). Any reasonable type of wireless communications may be used, including cellular, wireless internet connections, radio, or the like. In this example, the database may both receive data from the power management device and/or transmit data or instructions to the power management device. Communication between the power management device and other components that are remotely located (e.g., memory, processor, information inputs) may also be used to update or correct the power management device. For example, the operational parameters of the vehicle may be revised or updated

from a remote source. In some variations, control logic (e.g., power management control logic) may be remotely updated or revised.

The concepts described above may be used in various combinations to optimize the power used by a vehicle. Examples of power management systems, including methods of using them, are described below.

EXAMPLES

1. Fuel Efficient Hybrid vehicle

Using one variation of the power management system described herein (e.g., a power management system having an integrated with a GPS), a hybrid car approaching a large hill or grade can adjust the ratio of electric to ICE such that the batteries would be empty at the crest of the hill and fully charged at the bottom of the hill, and therefore would use less gasoline.

The same methods described above could be used to calculate the energy usage of the vehicle as in the previous example. The mix of electric to ICE can be based on the calculated energy usage and the energy stored in the batteries. The exact mechanism for instructing the hybrid vehicle to alter its electric/ICE ratio may vary between manufacturers.

2. Fuel Efficient Internal Combustion Engine (ICE) vehicle

Using one variation of the power management system described herein, an ICE car will speed up on a downhill when it knows that an uphill is the next terrain, and thereby use momentum

to get up the hill, using less gasoline. FIG. 1B illustrates this Example. As described previously, the system may determine the optimum energy using external and internal sensors and information, including the operational parameters appropriate to the vehicle.

5 Such operational parameters may vary from manufacturer to manufacturer (or vehicle to vehicle), and, as described above, could involve sending an electrical signal to a computer-based motor controller or even mechanically controlling the gas/air-flow mixture to the engine.

10

3. Energy efficient Solar-powered vehicle

Using one variation of the power management system described herein, a solar-powered car can ensure that it has adequate power to traverse a predetermined route. The power
15 management system may ensure that there is enough solar energy power for the route by slowing and speeding the car as necessary based on current energy levels and anticipated energy needs.

This example is similar to the example discussed when determining the optimum speed above, with a couple of additional
20 steps. In addition to calculating the energy usage, the system may also include a solar array model that could model the power generated by the solar array throughout the route base on the predicted weather, geographic location, and time of day. A battery model may also be included to keep track of the energy put into the
25 batteries by the solar array, and the energy drawn from the batteries by the motor. When selecting the optimum speeds to drive

the segments of the route, the system logic (e.g., software, hardware or both), may apply or access the battery model to prevent the battery from becoming completely drained.

5 4. Preventing Engine Flooding

One of the keys to efficient driving is not to step on the accelerator more than the engine can actually burn and use efficiently. Flooding the engine not only wastes gas but it doesn't maximize power, despite the drivers' demands. According to
10 one variation of the power management system described herein, a traditional ICE engine may be protected from flooding of the engine using the power management device.

In this variation of a power management device, power management device receives information inputs including a command
15 input (acceleration), at least two environmental inputs (air resistance), the operational status of the vehicle (velocity and engine temperature), and at least one operational parameter (e.g., maximum fuel volume). For example, the power management device may receive information about the amount of pressure that the driver is
20 applying to the accelerator. The power management system may also detect the current speed, resistance and temperature of the vehicle. This information input may be used to select the proper operational parameter of the vehicle. For example, the device may include a memory having a table of maximum fuel volumes for a given
25 velocity, resistance and temperature. Thus, the velocity, resistance and temperature data may be used to look up a maximum

fuel volume. In some variations, the maximum fuel volume may be calculate or estimated from this data. By comparing the operator demand (for acceleration) to supply fuel with the maximum amount of fuel that the engine can handle, the power management control logic
5 may correct for the drivers inefficiency, and instruct the motor control mechanism to provide the actual maximum amount of fuel to the engine, thereby avoiding flooding of the engine.

This is a last example is a very simplified case of the overall actions of the power management control system. In
10 general, the power management device intervenes between the driver and the engine. Thus, the power management device may interpret the driver commands so that the driving objective is achieved while maximizing the efficiency of the vehicle based on information that is not generally accessible or interpretable by the driver. While
15 the invention has been described in terms of particular variations and illustrative figures, those of skill in the art will recognize that the invention is not limited to the variations or figures described.

For example, in one variation the system would be able to
20 notify the driver the most fuel efficient speed for a route segment or segment destination. The notification might be via voice, written word, numbers, symbols, colors and/or the like. The vehicle operator can then manually adjust the vehicle speed based in response to the notification. In this example, the calculated
25 power would not necessarily be directly applied to the vehicle engine as it would just be used as a driver alert.

In still another variation, the power consumption calculation could further include or be based on calculating an optimal acceleration to (gradually) accelerate to the determined efficient speed to travel the segment destination or optimal
5 deceleration to (gradually) decelerate to the determined efficient speed to travel the segment destination. The calculation could for example incorporate GPS information, the determined efficient speed to travel the segment destination, or a combination thereof.

In still another variation, the information could be
10 based on past history information of the vehicle, information of one or more other vehicles traveling one or more of the same route segments, or a combination thereof. For example, if one drives the same route to work each day, the energy consumption of those various trips can be stored along with the speeds driven along
15 different segments of the route. From enough historical data, an optimized route could be determined.

In still another variation, the information could be stored information of vehicles traveling overlapping route segments. If many cars drive along overlapping segments, their
20 energy usage for those segments could be uploaded to e.g. a centralized server where optimized speeds for those segments could be calculated. Those optimized speeds could be shared in several ways such as, but not limiting to, (i) transmitted directly to cars, where they could be used in fuel economy optimizing cruise
25 control, (ii) transmitted to cars where they could used to provide recommendations to drivers, (iii) shared via a web site where

drivers could view recommendations, (iv) shared via a web site where drivers could compare their fuel economy to that of other drivers. The data could be used by state or local governments to adjust speed limits to improve the overall fuel economy of the cars that drive along their roads.

In still another variation, an automatic transmission vehicle could use the determined efficient speed to intelligently shift gears, i.e., the optimized speed for (upcoming) route segments could be used by the automatic transmission to make intelligent decisions about shifting gears which would improve overall drive train efficiency.

In addition, where methods and steps described above indicate certain events occurring in certain order, those of skill in the art will recognize that the ordering of certain steps may be modified and that such modifications are in accordance with the variations of the invention. Additionally, certain steps may be performed concurrently in a parallel process when possible, as well as performed sequentially as described above. Therefore, to the extent there are variations of the invention, which are within the spirit of the disclosure or equivalent to the inventions found in the claims, it is the intent that this patent will cover those variations as well. Finally, all publications and patent applications cited in this specification are herein incorporated by reference in their entirety as if each individual publication or patent application were specifically and individually put forth herein.

CLAIMS

1 1. An apparatus comprising:
2 a sensor interface configured to receive sensor data
3 samples during operation of a vehicle;
4 a memory configured to store said sensor data samples
5 over a number of points in time; and
6 a processor configured to (i) analyze said sensor data
7 samples stored in said memory to detect a pattern, (ii) predict a
8 destination of a driver in response to (a) said pattern and (b)
9 historical data associated with operation of said vehicle, wherein
10 (i) at least one of said sensor data samples is driver-related and
11 (ii) at least one of said sensor data samples comprises telemetry
12 data.

1 2. The apparatus according to claim 1, wherein said
2 telemetry data comprises map coordinates determined in response to
3 a GPS signal.

1 3. The apparatus according to claim 1, wherein said
2 telemetry data comprises map coordinates determined by a map
3 service.

1 4. The apparatus according to claim 1, wherein said
2 destination of said driver is predicted based on statistical
3 destination logic.

1 5. The apparatus according to claim 1, wherein said
2 processor is further configured to generate a likelihood that a
3 particular driver is operating said vehicle based on said pattern
4 detected.

1 6. The apparatus according to claim 1, wherein said
2 telemetry data is used to determine route segments.

1 7. The apparatus according to claim 6, wherein said
2 pattern comprises which of said route segments said vehicle has
3 traveled.

1 8. The apparatus according to claim 1, wherein said
2 apparatus is further configured to transmit said predicted
3 destination to a remote database.

1 9. The apparatus according to claim 8, wherein said
2 remote database is configured to receive a plurality of said
3 predicted destinations and generate guidance information based on
4 said plurality of said predicted destinations.

1 10. The apparatus according to claim 8, wherein said
2 remote database is configured to (i) receive said sensor data
3 samples and store said sensor data samples as said historical data
4 and (ii) present said historical data to said apparatus.

1 11. The apparatus according to claim 1, wherein said
2 memory is further configured to store said historical data.

1 12. The apparatus according to claim 1, wherein said
2 historical data comprises route segments traveled, a sequence of
3 route segments traveled and travel destinations.

1 13. The apparatus according to claim 1, wherein said
2 historical data comprises information about operation of said
3 vehicle.

1 14. The apparatus according to claim 1, wherein at least
2 one of said sensor data samples comprises a data sample from an
3 optical sensor.

1 15. A method for predicting a destination of a vehicle,
2 comprising the steps of:

3 (A) monitoring a plurality of sensors to generate sensor
4 data samples during operation of a vehicle;

5 (B) storing said sensor data samples over a number of
6 points in time;

7 (C) analyzing said sensor data samples to detect a
8 pattern; and

9 (D) predicting a destination of a driver in response to
10 (a) said pattern and (b) historical data associated with operation
11 of said vehicle, wherein (i) at least one of said sensor data

12 samples is driver-related and (ii) at least one of said sensor data
13 samples comprises telemetry data.

1 16. A vehicle comprising:
2 a power train;
3 a drive train;
4 a sensor interface configured to receive sensor data
5 samples during operation of a vehicle;
6 a storage device configured to store said sensor data
7 samples over a number of points in time; and
8 a processing device configured to (i) analyze said sensor
9 data samples stored in said storage device to detect a pattern,
10 (ii) predict a destination of a driver in response to (a) said
11 pattern and (b) historical data associated with operation of said
12 vehicle, wherein (i) at least one of said sensor data samples is
13 driver-related and (ii) at least one of said sensor data samples
14 comprises telemetry data.

1 17. The vehicle according to claim 16, further
2 comprising:
3 an apparatus configured to (i) receive said predicted
4 destination and (ii) adapt an operation of said vehicle based on
5 said predicted destination.

ABSTRACT

Described herein are devices, systems, and methods for managing the power consumption of an automotive vehicle, and thereby for optimizing the power consumption of the vehicle. The devices and systems for managing the power consumption of the vehicle typically include power management logic that can calculate an applied power for the vehicle engine based on information provided from the external environment of the vehicle, the operational status of the vehicle, one or more command inputs from a driver, and one or more operational parameters of the vehicle.

Docket No. 9748.00301c

DECLARATION FOR PATENT APPLICATION

We the undersigned inventors, hereby declare that:

Our residence and post office address are given next to our name;

We believe that we are an original joint inventor of the subject matter claimed in the application for patent entitled "**POWER MANAGEMENT SYSTEMS AND DESIGNS**", which:

 X is submitted herewith;

 was filed on as Application Serial No. ;

The above-identified application was made or authorized to be made by us.

We declare that all statements made herein were made with the knowledge that any willful false statement made in this declaration is punishable by fine or imprisonment of not more than five (5) years, or both, under Section 1001 of Title 18 of the United States Code.

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Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	70	70
UTILITY SEARCH FEE	2111	1	300	300
UTILITY EXAMINATION FEE	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
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1	Application Data Sheet	543800307c4_ADS_090817.pdf	1793930	no	10
			9a1f7335f305a67187fcf430a03e44e918f2d1d6		
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2	Drawings-only black and white line drawings	543800307c4_drawings_090817.pdf	139095	no	15
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3		543800307c4_application_090817.pdf	2881266	yes	70
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	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	63	
	Claims		64	67	
	Abstract		68	68	
	Oath or Declaration filed		69	70	
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	35167	no	2
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.