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UNITED STATES DEPARTMENT OF COMMERCE
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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.
16/137,860	12/07/2021	11194039	50334-US	2446

23589 7590 11/17/2021
Hovey Williams LLP
10801 Mastin Blvd., Suite 1000
Overland Park, KS 66210

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 519 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):

Kustom Signals, Inc., Lenexa, KS;

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)

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.

23589 7590 08/23/2021
Hovey Williams LLP
10801 Mastin Blvd., Suite 1000
Overland Park, KS 66210

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.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446

TITLE OF INVENTION: TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	11/23/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
MOORE, WHITNEY	3646	342-115000

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 _____
2 **Hovey Williams LLP**
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

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

Kustom Signals, Inc.

Lenexa, KS

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. 190522

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 /Thomas B. Luebbering/ Date 11/5/2021
Typed or printed name Thomas B. Luebbering Registration No. 37874

Electronic Patent Application Fee Transmittal				
Application Number:		16137860		
Filing Date:		21-Sep-2018		
Title of Invention:		TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		
First Named Inventor/Applicant Name:		Maurice Shelton		
Filer:		Thomas B. Luebbering/Angela Williams		
Attorney Docket Number:		50334-US		
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	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				600

Electronic Acknowledgement Receipt

EFS ID:	44213437
Application Number:	16137860
International Application Number:	
Confirmation Number:	2446
Title of Invention:	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION
First Named Inventor/Applicant Name:	Maurice Shelton
Customer Number:	23589
Filer:	Thomas B. Luebbering/Angela Williams
Filer Authorized By:	Thomas B. Luebbering
Attorney Docket Number:	50334-US
Receipt Date:	05-NOV-2021
Filing Date:	21-SEP-2018
Time Stamp:	11:52:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$600
RAM confirmation Number	E2021A5B53211737
Deposit Account	190522
Authorized User	Angela Williams

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)	PTO_Issue_Fee_50334-US_1820844-1.PDF	91983	no	1
			89fe336d97904179c5c88d19442f6d48120a98b8		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	38205	no	2
			3f62eacc73e191593e35048fd1d21533f0d9b449		

Warnings:

Information:

Total Files Size (in bytes):			130188
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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

23589 7590 08/23/2021
Hovey Williams LLP
10801 Mastin Blvd., Suite 1000
Overland Park, KS 66210

EXAMINER	
MOORE, WHITNEY	
ART UNIT	PAPER NUMBER
3646	

DATE MAILED: 08/23/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446

TITLE OF INVENTION: TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	11/23/2021

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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23589 7590 08/23/2021
Hovey Williams LLP
 10801 Mastin Blvd., Suite 1000
 Overland Park, KS 66210

Certificate of Mailing or Transmission

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(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446

TITLE OF INVENTION: TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	11/23/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
MOORE, WHITNEY	3646	342-115000

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☐ 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.**

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

1 _____

(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.

2 _____

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

(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)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

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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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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446
23589	7590	08/23/2021	EXAMINER	
Hovey Williams LLP			MOORE, WHITNEY	
10801 Mastin Blvd., Suite 1000			ART UNIT	
Overland Park, KS 66210			PAPER NUMBER	
			3646	
DATE MAILED: 08/23/2021				

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) 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. 16/137,860	Applicant(s) Shelton, Maurice	
	Examiner WHITNEY T MOORE	Art Unit 3646	AIA (FITF) Status Yes

-- 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 10 August 2021.
☐ 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 1,3-15 and 21. 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. _____	5. ☐ Examiner's Amendment/Comment 6. ☒ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____
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/WHITNEY MOORE/
Primary Examiner, Art Unit 3646

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Allowable Subject Matter

Claims 1, 3-15 and 21 are allowed.

The following is an examiner's statement of reasons for allowance: Referring to Claim 1, the prior art of record does not disclose nor suggest it be an obvious modification wherein a speed determining element configured to determine and output a speed of the patrol vehicle and not receive signals or data from the patrol vehicle; and a processing element configured to receive a plurality of digital data samples derived from one of either the first or second electronic signals, receive the speed of the patrol vehicle from the speed determining element, perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a frequency bin number, having a relative magnitude value, and corresponding to a speed of a vehicle, convert the speed of the patrol vehicle to a frequency bin number, form a patrol vehicle speed window that includes a range of frequency bin numbers having the frequency bin number of the converted patrol vehicle speed as a center of the range, determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, convert one frequency bin number in each group to the relative speed of one target vehicle, and convert the relative speed of the target vehicle to an absolute speed using the speed

of the patrol vehicle; Referring to Claim 10, this claim was allowed in the previous office action and remains allowed for the same reason.

Claims 2, 3-9, 11-15 and 21 are dependent on Claims 1 and 10 and are allowed for the same reasons.

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

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US PGPub 2015/0243165 teaches a system that is considered relevant to the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WHITNEY T MOORE whose telephone number is (571)270-3338. The examiner can normally be reached on Monday-Friday from 7am-4pm.

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, Jack Keith can be reached on (571) 272-6878. 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.

/WHITNEY MOORE/
Primary Examiner, Art Unit 3646

<i>Notice of References Cited</i>	Application/Control No. 16/137,860		Applicant(s)/Patent Under Reexamination Shelton, Maurice	
	Examiner WHITNEY T MOORE		Art Unit 3646	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-20150243165-A1	08-2015	Elsheemy; Mohamed Roshdy	B60R25/00	340/906
	B					
	C					
	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.

Issue Classification 	Application/Control No. 16/137,860	Applicant(s)/Patent Under Reexamination Shelton, Maurice	
	Examiner WHITNEY T MOORE	Art Unit 3646	

CPC						
Symbol					Type	Version
G01S	/	13	/	92	F	2013-01-01
G01S	/	7	/	04	I	2013-01-01
G01S	/	13	/	87	I	2013-01-01
G01S	/	7	/	4052	I	2013-01-01
G01S	/	13	/	58	I	2013-01-01
G01S	/	7	/	288	I	2013-01-01
G01S	/	2013	/	932	A	2020-01-01
G01S	/	7	/	2883	A	2021-05-01
G01S	/	7	/	4082	A	2021-05-01

CPC Combination Sets					
Symbol				Type	Set
	/		/		

NONE (Assistant Examiner) _____ (Date) _____		Total Claims Allowed: 15	
/WHITNEY MOORE/ Primary Examiner, Art Unit 3646 (Primary Examiner) _____ (Date) 17 August 2021		O.G. Print Claim(s) 1	O.G. Print Figure 1

Issue Classification 	Application/Control No. 16/137,860	Applicant(s)/Patent Under Reexamination Shelton, Maurice
	Examiner WHITNEY T MOORE	Art Unit 3646

INTERNATIONAL CLASSIFICATION					
CLAIMED					
G01S13/92	/	13	/	92	
G01S7/04	/	7	/	04	
G01S13/87	/	13	/	87	
G01S7/40	/	7	/	40	
G01S13/58	/	13	/	58	
G01S7/288	/	7	/	288	
G01S13/931	/	13	/	931	
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	15	
/WHITNEY MOORE/ Primary Examiner, Art Unit 3646	17 August 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 16/137,860	Applicant(s)/Patent Under Reexamination Shelton, Maurice
	Examiner WHITNEY T MOORE	Art Unit 3646

☐ 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
1	1	9	10		19										
	2	10	11		20										
2	3	11	12	13	21										
3	4	12	13												
4	5	14	14												
5	6	15	15												
6	7		16												
7	8		17												
8	9		18												

NONE	Total Claims Allowed:	
(Assistant Examiner)	(Date)	15
/WHITNEY MOORE/ Primary Examiner, Art Unit 3646	17 August 2021	O.G. Print Claim(s)
(Primary Examiner)	(Date)	O.G. Print Figure
		1
		1

<i>Search Notes</i> 	Application/Control No. 16/137,860	Applicant(s)/Patent Under Reexamination Shelton, Maurice
	Examiner WHITNEY T MOORE	Art Unit 3646

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

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
PE2E-Search (Search History Printout)	04/01/2021	WM
Assignee/Inventor Search	04/01/2021	WM
PE2E-Search (Updated Search History Printout)	07/15/2021	WM
(G01S13/92,87,58 G01S7/4052,288,04,2883,4082 G01S2013/932) see printout for details	07/15/2021	WM
PE2E-Search (Updated Search History Printout)	08/17/2021	WM

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
See	Interference Section of Search History Printout	08/17/2021	WM

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1	"16137860"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:02 PM
L2	7	"16137860" "16137004" "16151788"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:03 PM
L3	17	("20050253749" "20130307984" "20150219758" "20160103218" "6198427" "7038614").PN.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:50 PM
L4	28	("5400034" "20050062642" "20150219752" "20030058154" "20090002221" "20120280855" "9689969" "20050265124" "5691724" "20060181449").PN.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:51 PM
L5	45	3 OR 4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 02:03 PM
L6	89	(determin\$3 near2 speed) near5 ((police patrol) near2 (car vehicle))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 02:18 PM
L7	5	"20110095938"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 02:22 PM
L8	1	((determin\$3 near2 speed) near5 ((police patrol) near2 (car vehicle))) SAME (GNSS satellite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 03:27 PM
L9	31	((speed) near5 ((police patrol) near2 (car vehicle))) SAME (GNSS satellite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 03:28 PM
L10	35	(determin\$3) near5 ((police patrol) near2 (car vehicle)) near5	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO;	OR	ON	ON	2021/04/01 08:49 AM

L11	44	(moving stationary) (determin\$3) near5 ((police patrol) near2 (car vehicle)) near5 (moving stationary parked)	JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/04/01 08:49 AM
L12	1	((determin\$3) near5 ((police patrol) near2 (car vehicle)) near5 (moving stationary parked)) SAME threshold	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/04/01 08:50 AM
L13	30147	(G01S13/92,87,58 G01S7/4052,288,04,28 83,4082 G01S2013/932).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:34 PM
L14	5293	traffic near2 radar	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:35 PM
L15	223	(police partol) near2 (car vehicle) WITH (speed near2 detect\$3)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:36 PM
L16	2	14 AND 15	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:36 PM
L17	293	(police partol) near2 (car vehicle) WITH (speed near2 (determin\$5 detect\$3))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:36 PM
L18	9	13 AND 17	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:38 PM
L19	453	((police partol) near2 (car vehicle)) SAME (speed near2 (determin\$5 detect\$3))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:42 PM
L20	144255	(determin\$5 detect\$3) near4 (speed velocity) near5 (target object)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:43 PM
L21	153	19 AND 20	(US-PGPUB; USPAT;	OR	ON	ON	2021/07/15

L22	29239	absolute near2 speed	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	01:43 PM
L23	14	21 AND 22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:44 PM
L24	13	21 AND (GNSS satellite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:45 PM
L25	5	"9689969"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 02:15 PM
L26	1551	(speed near3 determin\$3 near2 (unit element)) WITH ((signal data) WITH vehicle)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:06 PM
L27	49	22 AND 26	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:07 PM
L28	0	((police partol) near2 (car vehicle)) AND 27	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:24 PM
L29	8	((police partol) near2 (car vehicle)) AND 26	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:24 PM
L30	10	("6133854" "7821422" "20060066472" "20090248222" "20130009760" "20130069799" "20160163194").pn. OR ("10121370").urpn. AND (PGPB USPT USOC).dbnm.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2021/08/17 01:43 PM
L31	615628	(unit element device) WITH determin\$3 WITH	(US-PGPUB; USPAT; USOCR; FIT (CN, FR,	OR	ON	ON	2021/08/17 01:54 PM

L32	1843	speed ((police partol) near2 (car vehicle)) AND 31	WO); FPRS; EPO; JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:54 PM
L33	51	22 AND 32	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:54 PM
L34	33	20 AND 33	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:55 PM
L35	109	((unit element device) WITH determin\$3 WITH speed) SAME ((police partol) near2 (car vehicle))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:56 PM
L36	5	13 AND 35	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 01:57 PM
L37	5	22 AND 35	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/08/17 02:02 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	0	((unit element device) WITH determin\$3 WITH speed) SAME ((police partol) near2 (car vehicle))).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17 02:02 PM
N2	15	((unit element device) WITH determin\$3 WITH speed) AND ((police partol) near2 (car vehicle))).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17 02:03 PM
N3	2734	(speed near3 determin\$3 near2 (unit element)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17 02:16 PM
N4	521	((police partol) near2 (car vehicle)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17 02:17 PM
N5	2	3 AND 4	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17

N6	11094	((determin\$5 detect\$3) near4 (speed velocity) near5 (target object)).clm.	(US-PGPUB; USPAT)	OR	ON	ON	02:17 PM 2021/08/17 02:18 PM
N7	16	4 AND 6	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17 02:18 PM
N8	879	(absolute near2 speed).clm.	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17 02:18 PM
N9	1	7 AND 8	(US-PGPUB; USPAT)	OR	ON	ON	2021/08/17 02:18 PM

Bibliographic Data

Application No: 16/137,860

Foreign Priority claimed: ☐ Yes ☒ No

35 USC 119 (a-d) conditions met: ☐ Yes ☒ No ☐ Met After Allowance

Verified and Acknowledged: /WHITNEY MOORE/

Examiner's Signature

Initials

Title:

TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED
DETECTION

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/21/2018	342	3646	50334-US
RULE			

APPLICANTS

Kustom Signals, Inc., Lenexa, KS,

INVENTORS

Maurice Shelton, Buffalo, KS, UNITED STATES

CONTINUING DATA

This application has PRO of 62570446 10/10/2017

This application has PRO of 62569667 10/09/2017

This application has PRO of 62569923 10/09/2017

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/12/2018

**** SMALL ENTITY ****

STATE OR COUNTRY

UNITED STATES

ADDRESS

Hovey Williams LLP
10801 Mastin Blvd., Suite 1000
Overland Park, KS 66210
UNITED STATES

FILING FEE RECEIVED

\$785

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

SHELTON, Maurice

Serial No.: 16/137,860

Filed: 09/21/2018

TRAFFIC RADAR SYSTEM WITH
PATROL VEHICLE SPEED DETECTION

Docket No.: 50334-US

Group Art Unit No.: 3646

Customer No.: 23589

Confirmation No.: 2446

Examiner: MOORE, Whitney

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

OK TO ENTER: /W.M/

AMENDMENT

In response to the Office Action dated July 20, 2021, Applicant respectfully requests amendment and reconsideration of the above-identified application. The amendment is submitted after a final Office Action, but Applicant believes that the amendment places all claims in allowable condition.

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this document.

Remarks begin on page 8 of this document.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446
23589	7590	08/11/2021	EXAMINER	
Hovey Williams LLP			MOORE, WHITNEY	
10801 Mastin Blvd., Suite 1000			ART UNIT	PAPER NUMBER
Overland Park, KS 66210			3646	
			NOTIFICATION DATE	DELIVERY MODE
			08/11/2021	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):

uspatents@hoveywilliams.com

<i>Applicant-Initiated Interview Summary</i>	Application No. 16/137,860	Applicant(s) Shelton, Maurice		
	Examiner WHITNEY T MOORE	Art Unit 3646	AIA (First Inventor to File) Status Yes	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
WHITNEY T MOORE	Primary Examiner	Telephonic
Richard Rozier, Ph.D.	Paent Agent	

Date of Interview: 09 August 2021

Issues Discussed:

Proposed Amendment(s)

Applicant called to discuss language to overcome the prior art, see attachment. It was agreed that some re-wording of the the language would overcome the current rejection and that an updated search would be conducted once the amendment is filed.

☒ Attachment

/WHITNEY MOORE/ Primary Examiner, Art Unit 3646	/WHITNEY MOORE/ Primary Examiner, Art Unit 3646
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	

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

SHELTON, Maurice

Serial No.: 16/137,860

Filed: 09/21/2018

TRAFFIC RADAR SYSTEM WITH
PATROL VEHICLE SPEED DETECTION

Docket No.: 50334-US

Group Art Unit No.: 3646

Customer No.: 23589

Confirmation No.: 2446

Examiner: MOORE, Whitney

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

PROPOSED AMENDMENT

In response to the Office Action dated July 20, 2021, Applicant respectfully submits an amendment to claim 1 of the above-identified application to be discussed in an interview with the Examiner. The proposed amendment is not to be entered into the record.

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this document.

Remarks begin on page 3 of this document.

Listing of Claims:

1. (Currently Amended) A traffic radar system comprising:
 - a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element not receiving signals or data from in electronic communication with the patrol vehicle and configured to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from one of either the first or second electronic signals,
 - receive the speed of the patrol vehicle from the speed determining element,
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a frequency bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - convert the speed of the patrol vehicle to a frequency bin number,
 - form a patrol vehicle speed window that includes a range of frequency bin numbers having the frequency bin number of the converted patrol vehicle speed as a center of the range,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value,
 - convert one frequency bin number in each group to the relative speed of one target vehicle, and
 - convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

Remarks:

Applicant has amended claim 1 to overcome the 35 U.S.C. § 112(b) rejection. The claimed traffic radar system now includes a speed determining element not receiving signals or data from the patrol vehicle and configured to determine and output a speed of the patrol vehicle. Applicant respectfully submits that the newly-added limitation provides clarity about the lack of communication between the patrol vehicle and the speed determining element of the traffic radar system.

The Office Action of July 20, 2021 asserts that “Inherently the element has to be in some sort of electronic communication as it is electrically connected to the main unit which is connected to the patrol vehicle.” Applicant submits that this assertion is not entirely true. While the (speed determining) element is electrically connected to the main unit, the only connection between the main unit and the patrol vehicle is mechanical. As stated in paragraph [0023] of the filed specification, the main unit includes a housing which may be mounted on or in the patrol vehicle dashboard or center console. There does not have to be any electronic communication or electrical connection between the main unit, or any components thereof (including the speed determining element), and the patrol vehicle. In fact, the main unit may be battery powered, solar powered, or a combination of the two. So the main unit would not even need electric power from the patrol vehicle. Since the main unit includes its own display and user interface, the main unit is completely self contained, so that all it needs from the patrol vehicle is a place to be mounted.

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/137,860		Filing Date 09/21/2018		☐ 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), (i), 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 \$50 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$230 =					
☐ 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	08/10/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0			x \$50 =		0	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0			x \$240 =		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			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.								SLIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".								/FELICIA R FARMER/			
*** 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:

SHELTON, Maurice

Serial No.: 16/137,860

Filed: 09/21/2018

TRAFFIC RADAR SYSTEM WITH
PATROL VEHICLE SPEED DETECTION

Docket No.: 50334-US

Group Art Unit No.: 3646

Customer No.: 23589

Confirmation No.: 2446

Examiner: MOORE, Whitney

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

AMENDMENT

In response to the Office Action dated July 20, 2021, Applicant respectfully requests amendment and reconsideration of the above-identified application. The amendment is submitted after a final Office Action, but Applicant believes that the amendment places all claims in allowable condition.

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this document.

Remarks begin on page 8 of this document.

Listing of Claims:

1. (Currently Amended) A traffic radar system comprising:
 - a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element ~~not in electronic communication with the patrol vehicle and~~ configured to determine and output a speed of the patrol vehicle and not receive signals or data from the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from one of either the first or second electronic signals,
 - receive the speed of the patrol vehicle from the speed determining element,
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a frequency bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - convert the speed of the patrol vehicle to a frequency bin number,
 - form a patrol vehicle speed window that includes a range of frequency bin numbers having the frequency bin number of the converted patrol vehicle speed as a center of the range,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value,
 - convert one frequency bin number in each group to the relative speed of one target vehicle, and
 - convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

2. (Canceled)

3. (Original) The traffic radar system of claim 1, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

4. (Original) The traffic radar system of claim 1, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

5. (Original) The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages.

6. (Original) The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

7. (Original) The traffic radar system of claim 1, wherein the speed determining element is further configured to receive and process radio frequency signals from a global navigation satellite system.

8. (Original) The traffic radar system of claim 1, further comprising a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

9. (Original) The traffic radar system of claim 1, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

10. (Previously Amended) A traffic radar system comprising:
- a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element configured to receive and process radio frequency signals from a global navigation satellite system to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from one of either the first or second electronic signals,
 - receive the speed of the patrol vehicle from the speed determining element,
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a frequency bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - convert the speed of the patrol vehicle to a frequency bin number,
 - form a patrol vehicle speed window that includes a range of frequency bin numbers having the frequency bin number of the converted patrol vehicle speed as a center of the range,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value,
 - convert one frequency bin number in each group to the relative speed of one target vehicle, and
 - convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

11. (Original) The traffic radar system of claim 10, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

- add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
- subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
- subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

12. (Original) The traffic radar system of claim 10, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

13. (Original) The traffic radar system of claim 10, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to

- determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages, and
- determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

14. (Original) The traffic radar system of claim 10, further comprising a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

15. (Original) The traffic radar system of claim 10, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

16-20. (Canceled)

21. (Previously Presented) The traffic radar system of claim 13, wherein the processing element is further configured to set a mode of speed detection to moving when the processing element determines that the patrol vehicle is moving or to stationary when the processing element determines that the patrol vehicle is stationary.

Remarks:

Status of Claims

Claims 1-15 were previously presented with claims 1 and 10 being independent. Claims 1 and 10 have been amended, claim 2 has been canceled, and claim 21 has been added. Thus, claims 1, 3-15, and 21 are currently presented with claims 1 and 10 being independent.

Examiner Interview

Applicant would like to thank the Examiner for his time during the interview of August 9, 2021, during which an amendment to claim 1 to overcome the rejection under 35 U.S.C. § 112(b) was discussed. The Examiner indicated that the amendment overcomes the rejection. Applicant points out that the language of the current amendment has been changed slightly from what was discussed. Originally, the amendment was discussed as follows: “a speed determining element ~~not in electronic communication with the patrol vehicle and~~ configured to determine and output a speed of the patrol vehicle and not receiving signals or data from the patrol vehicle”. Upon further consideration, Applicant believes that changing the word “receiving” to “receive” reads more smoothly.

Office Action

Claim Rejections under 35 U.S.C. § 112

The Office Action of July 20, 2021 rejected claims 1-9 under 35 U.S.C. § 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or joint inventor regards as the invention. Specifically, the Office Action asserted that the limitation “not in electronic communication” is not clear. Applicant has amended claim 1 to now recite that the speed determining element is configured to determine and output a speed of the patrol vehicle and not receive signals or data from the patrol vehicle. As mentioned above, the Examiner indicated that the amendment overcomes the rejection.

Allowable Subject Matter

The Office Action indicated that claims 10-15 and 21 are allowed.

Conclusion

In view of this response and the remarks herein, Applicant respectfully submits that claims 1, 3-15, and 21 are in allowable condition and requests a corresponding Notice of Allowance. In the event of further questions, the Examiner is urged to call the undersigned. Any additional fee which might be due in connection with this application should be applied against our Deposit Account No. 19-0522.

Respectfully submitted,

HOVEY WILLIAMS LLP

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ATTORNEYS FOR APPLICANT(S)

(Docket No. 50334-US)

Electronic Acknowledgement Receipt

EFS ID:	43473686
Application Number:	16137860
International Application Number:	
Confirmation Number:	2446
Title of Invention:	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION
First Named Inventor/Applicant Name:	Maurice Shelton
Customer Number:	23589
Filer:	Thomas B. Luebbering/Angela Williams
Filer Authorized By:	Thomas B. Luebbering
Attorney Docket Number:	50334-US
Receipt Date:	10-AUG-2021
Filing Date:	21-SEP-2018
Time Stamp:	16:02:35
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PTO_Amendment_50334_1768 961-1.PDF	143424 db07f447d62371ed4cc7a69593722d2fd5a 7e712	yes	9

Multipart Description/PDF files in .zip description			
Document Description	Start	End	
Response After Final Action	1	1	
Claims	2	7	
Applicant Arguments/Remarks Made in an Amendment	8	9	

Warnings:

Information:

Total Files Size (in bytes):	143424
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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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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446
23589	7590	07/20/2021		
Hovey Williams LLP 10801 Mastin Blvd., Suite 1000 Overland Park, KS 66210			EXAMINER MOORE, WHITNEY	
			ART UNIT	PAPER NUMBER
			3646	
			NOTIFICATION DATE	DELIVERY MODE
			07/20/2021	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):

uspatents@hoveywilliams.com

Office Action Summary

Application No.

16/137,860

Applicant(s)

Shelton, Maurice

Examiner

WHITNEY T MOORE

Art Unit

3646

AIA (FITF) Status

Yes

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 29 June 2021.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2a) ☒ This action is **FINAL**.

2b) ☐ This action is non-final.

3) ☐ 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.

4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☒ Claim(s) 1,3-15 and 21 is/are pending in the application.

5a) Of the above claim(s) ____ is/are withdrawn from consideration.

6) ☒ Claim(s) 10-15 and 21 is/are allowed.

7) ☒ Claim(s) 1 and 3-9 is/are rejected.

8) ☐ Claim(s) ____ is/are objected to.

9) ☐ Claim(s) ____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, 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.

Application Papers

10) ☐ The specification is objected to by the Examiner.

11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12) ☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

3) ☐ Interview Summary (PTO-413)

Paper No(s)/Mail Date ____.

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)

4) ☐ Other: ____.

Paper No(s)/Mail Date ____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 and 3-9 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Referring to Claim 1, the limitation "...not in electronic communication..." is not clear. As was previously stated, it is not clear how the speed determining element cannot be associated or in electronic communication with the patrol vehicle. Inherently the element has to be in some sort of electronic communication as it is electrically connected to the main unit which is connected to the patrol vehicle. For the same reasons as previously stated, this claim is found to be indefinite and correction is required.

Claims 3-9 are dependent on Claim 1 and are subject to the same rejection.

Allowable Subject Matter

Claims 10-15 and 21 are allowed.

The following is an examiner's statement of reasons for allowance: Referring to Claim 10, the prior art of record does not disclose nor suggest it be an obvious modification wherein a processing element configured to receive a plurality of digital data samples derived from one of either the first or second electronic signals, receive the speed of the patrol vehicle from the speed determining element, perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a frequency bin number, having a relative magnitude value, and corresponding to a speed of a vehicle, convert the speed of the patrol vehicle to a frequency bin number, form a patrol vehicle speed window that includes a range of frequency bin numbers having the frequency bin number of the converted patrol vehicle speed as a center of the range, determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, convert one frequency bin number in each group to the relative speed of one target vehicle, and convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

Claims 11-15 and 21 are dependent on Claim 10 and are allowed for the same reason.

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."

Response to Arguments

Applicant's arguments filed 29 June 2021 have been fully considered but they are not persuasive. While the amendments have overcome the art of record, Claim 1 remains rejected under 112 in manner similar to that previously stated. While the Applicant has provided citations that are believed to disclose what is claimed, the Examiner disagrees. While it is clear and understood that the Applicant is attempting to claim the speed determining element in a manner different than that of Claim 10, that is what is disclosed in the cited paragraphs by the Applicant. It is suggest that Applicant claim the limitation in a manner that makes it clear what type of communication is not being provided by the patrol car as is disclosed in the Applicants arguments page 8. Applicant states that element receives no electronic signals such as speed from the vehicle's speedometer, this is not the same as the element is not in electronic communication with the patrol vehicle. As such the Claim remains rejected as being indefinite.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WHITNEY T MOORE whose telephone number is (571)270-3338. The examiner can normally be reached on Monday-Friday from 7am-4pm.

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, Jack Keith can be reached on (571) 272-6878. 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.

/WHITNEY MOORE/
Primary Examiner, Art Unit 3646

<i>Search Notes</i> 	Application/Control No. 16/137,860	Applicant(s)/Patent Under Reexamination Shelton, Maurice
	Examiner WHITNEY T MOORE	Art Unit 3646

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

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
PE2E-Search (Search History Printout)	04/01/2021	WM
Assignee/Inventor Search	04/01/2021	WM
PE2E-Search (Updated Search History Printout)	07/15/2021	WM
(G01S13/92,87,58 G01S7/4052,288,04,2883,4082 G01S2013/932) see printout for details	07/15/2021	WM

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

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1	"16137860"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:02 PM
L2	7	"16137860" "16137004" "16151788"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:03 PM
L3	17	("20050253749" "20130307984" "20150219758" "20160103218" "6198427" "7038614").PN.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:50 PM
L4	28	("5400034" "20050062642" "20150219752" "20030058154" "20090002221" "20120280855" "9689969" "20050265124" "5691724" "20060181449").PN.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 01:51 PM
L5	45	3 OR 4	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 02:03 PM
L6	89	(determin\$3 near2 speed) near5 ((police patrol) near2 (car vehicle))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 02:18 PM
L7	5	"20110095938"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 02:22 PM
L8	1	((determin\$3 near2 speed) near5 ((police patrol) near2 (car vehicle))) SAME (GNSS satellite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 03:27 PM
L9	31	((speed) near5 ((police patrol) near2 (car vehicle))) SAME (GNSS satellite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/03/31 03:28 PM
L10	35	(determin\$3) near5 ((police patrol) near2 (car vehicle)) near5	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO;	OR	ON	ON	2021/04/01 08:49 AM

L11	44	(moving stationary) (determin\$3) near5 ((police patrol) near2 (car vehicle)) near5 (moving stationary parked)	JPO; DERWENT; IBM_TDB) (US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/04/01 08:49 AM
L12	1	((determin\$3) near5 ((police patrol) near2 (car vehicle)) near5 (moving stationary parked)) SAME threshold	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/04/01 08:50 AM
L13	30147	(G01S13/92,87,58 G01S7/4052,288,04,28 83,4082 G01S2013/932).cpc.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:34 PM
L14	5293	traffic near2 radar	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:35 PM
L15	223	(police partol) near2 (car vehicle) WITH (speed near2 detect\$3)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:36 PM
L16	2	14 AND 15	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:36 PM
L17	293	(police partol) near2 (car vehicle) WITH (speed near2 (determin\$5 detect\$3))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:36 PM
L18	9	13 AND 17	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:38 PM
L19	453	((police partol) near2 (car vehicle)) SAME (speed near2 (determin\$5 detect\$3))	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:42 PM
L20	144255	(determin\$5 detect\$3) near4 (speed velocity) near5 (target object)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:43 PM
L21	153	19 AND 20	(US-PGPUB; USPAT;	OR	ON	ON	2021/07/15

L22	29239	absolute near2 speed	USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	01:43 PM
L23	14	21 AND 22	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:44 PM
L24	13	21 AND (GNSS satellite)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 01:45 PM
L25	5	"9689969"	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2021/07/15 02:15 PM

PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

SHELTON, Maurice

Serial No.: 16/137,860

Filed: 09/21/2018

TRAFFIC RADAR SYSTEM WITH
PATROL VEHICLE SPEED DETECTION

Docket No.: 50334-US

Group Art Unit No.: 3646

Customer No.: 23589

Confirmation No.: 2446

Examiner: MOORE, Whitney

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

AMENDMENT

In response to the Office Action dated April 6, 2021, Applicant respectfully requests amendment and reconsideration of the above-identified application.

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this document.

Remarks begin on page 8 of this document.

Electronic Acknowledgement Receipt

EFS ID:	43121195
Application Number:	16137860
International Application Number:	
Confirmation Number:	2446
Title of Invention:	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION
First Named Inventor/Applicant Name:	Maurice Shelton
Customer Number:	23589
Filer:	Thomas B. Luebbering/Angela Williams
Filer Authorized By:	Thomas B. Luebbering
Attorney Docket Number:	50334-US
Receipt Date:	29-JUN-2021
Filing Date:	21-SEP-2018
Time Stamp:	15:01:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PTO_Amendment_50334_1744 105-1.PDF	153244	yes	11
			5478e0aad1fc2985948f67474455c5ee1a150864		

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Applicant Arguments/Remarks Made in an Amendment		8	11
Claims		2	7
Amendment/Req. Reconsideration-After Non-Final Reject		1	1
Warnings:			
Information:			
Total Files Size (in bytes):		153244	
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.			

Remarks:

Status of Claims

Claims 1-15 were previously presented with claims 1 and 10 being independent. Claims 1 and 10 have been amended, claim 2 has been canceled, and claim 21 has been added. Thus, claims 1, 3-15, and 21 are currently presented with claims 1 and 10 being independent.

Office Action

Claim Rejections under 35 U.S.C. § 112

The Office Action of April 6, 2021 rejected claims 1-9 under 35 U.S.C. § 112(b) as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or joint inventor regards as the invention. Specifically, the Office Action asserted that “a clarity issue arises with respect to the limitation directed to the speed determining element. It is not clear what is meant by a speed determining element not associated with the patrol vehicle and configured to determine and output a speed of the patrol vehicle.” Applicant has amended claim 1 to now recite that the speed determining element is not in electronic communication with the patrol vehicle. This change clarifies that the speed determining element receives no electronic signals, such as speed from the vehicle’s speedometer, from the patrol vehicle. In fact, as described in paragraph [0031] of the originally-filed specification, the “speed determining element 22 may receive and process radio frequency (RF) signals from a multi-constellation global navigation satellite system (GNSS) such as the global positioning system (GPS), the GLONASS system, the Galileo system, the quasi-zenith satellite system (QZSS), and so forth. The speed determining element 22 may also may receive and process RF signals from telecommunications networks that provide or utilize Assisted GPS (A-GPS).” Thus, the speed determining element receives no electronic signals from the patrol vehicle. Applicant respectfully requests withdrawal of the current rejection.

Claim Rejections under 35 U.S.C. § 102

The Office Action rejected claims under 35 U.S.C. § 102(a)(1) as being anticipated by Aker *et al.* (U.S. Patent Application Publication No. 2005/0062642), hereinafter “Aker 1”. Applicant has amended claim 1 to include distinctive features not disclosed by Aker 1, which places claim 1 in allowable condition.

The amendment to claim 1 includes specifying that the processing element receives a plurality of digital data samples derived from one of either the first or second electronic signals, wherein the first electronic signal is communicated from the front radar transceiver and the second electronic signal is communicated from the rear radar transceiver. Thus, the processing element of the current invention processes the data from one transceiver only at a given time. This feature by itself distinguishes the current invention from Aker 1, as Aker 1 processes the data from **both** the front antenna (transceiver) and the rear antenna generally simultaneously, as shown in at least FIGURE 4 and described in at least paragraphs [0068]-[0074]. This feature also illustrates the fundamental difference in operation between the current invention and Aker 1 and leads to other differences between the current invention and Aker 1, as discussed below.

The amendment to claim 1 also includes limitations from original claim 2 which include performing a frequency domain conversion and creating a plurality of frequency bins in a positive frequency domain. This feature points out another difference between the current invention and Aker 1. Aker 1 performs a frequency domain conversion that results in a positive frequency domain and a negative frequency domain. Both the current invention and Aker 1 include a spike in the frequency domain that represents the patrol vehicle which results from environmental reflections. As discussed in Aker 1 paragraph [0070] and shown in FIGURE 4, since Aker 1 converts the data from both the front antenna and the rear antenna, there are two patrol vehicle spikes – one in the positive frequency domain and one in the negative frequency domain, with each spike having roughly the same magnitude and each being roughly equidistant from the zero frequency axis. In contrast, since the current invention converts the data from only one transceiver at a time, there is only one patrol vehicle spike in the frequency domain. In order to identify the patrol vehicle spikes so that the spikes will not be confused with other vehicle spikes, Aker 1 looks for the two spikes having roughly the same magnitude and being

roughly equidistant from the zero frequency axis. In contrast, the current invention performs the newly added step of converting the speed of the patrol vehicle (from the speed determining element) to a frequency bin number, that marks the center of a window outside of which the spikes of other vehicles are determined.

Numerous differences between Aker 1 and the current invention have been discussed above. Applicant further submits that it would not be obvious to modify Aker 1 to create the current invention. Given that Aker 1 processes the data from two antennas at the same time and the current invention processes the data from only one, Aker 1 would have to be modified so that it would not function as intended (or perhaps not function at all) in order to operate as the current invention does. In addition, Aker 1 teaches away from the processing of data from one antenna only which produces a single patrol vehicle spike in the frequency domain, as the current invention does. In paragraphs [0070] and [0098], Aker 1 discusses the problem of “resetting of patrol speed search and acquisition processes”, which Aker 1 believes results from “a single PS reading” or “a single radar signal”.

From the discussion above, it is clear that the current invention is neither anticipated by, or obvious in view of, Aker 1. Thus, independent claim 1 and its dependent claims are in allowable condition. Accordingly, Applicant requests withdrawal of the current rejection.

Claim Rejections under 35 U.S.C. § 103

The Office Action rejected claims 5 and 6 under 35 U.S.C. § 103 as being unpatentable over Aker 1 in view of Aker (U.S. Patent Application Publication No. 2006/0181449), hereinafter Aker 2. The Office Action rejected claims 7, 10-12, 14, and 15 under 35 U.S.C. § 103 as being unpatentable over Aker 1 in view of Okamura *et al.* (U.S. Patent Application Publication No. 2018/0225961), hereinafter Okamura. The Office Action rejected claim 13 under 35 U.S.C. § 103 as being unpatentable over Aker 1 as modified by Okamura in view of Aker 2. Given the discussion above that the current invention is not anticipated or rendered obvious by Aker 1 and the currently listed claims are rejected as being unpatentable over Aker 1, Applicant submits that the currently listed

claims are allowable as well for at least the same reasons. Accordingly, Applicant requests withdrawal of the current rejection.

Conclusion

In view of this response and the remarks herein, Applicant respectfully submits that claims 1, 3-15, and 21 are in allowable condition and requests a corresponding Notice of Allowance. In the event of further questions, the Examiner is urged to call the undersigned. Any additional fee which might be due in connection with this application should be applied against our Deposit Account No. 19-0522.

Respectfully submitted,

HOVEY WILLIAMS LLP

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ATTORNEYS FOR APPLICANT(S)

(Docket No. 50334-US)

Listing of Claims:

1. (Currently Amended) A traffic radar system comprising:
 - a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element not in electronic communication associated with the patrol vehicle and configured to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from one of either the first or second electronic signals,
 - receive the speed of the patrol vehicle from the speed determining element,
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a frequency bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - convert the speed of the patrol vehicle to a frequency bin number,
 - form a patrol vehicle speed window that includes a range of frequency bin numbers having the frequency bin number of the converted patrol vehicle speed as a center of the range,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value,
 - convert one frequency bin number in each group to the relative speed of one target vehicle, and
 - ~~process the digital data samples to determine a relative speed of at least one target vehicle in the front zone or the rear zone, and~~

convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

2. (Canceled)

3. (Original) The traffic radar system of claim 1, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

4. (Original) The traffic radar system of claim 1, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

5. (Original) The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages.

6. (Original) The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

7. (Original) The traffic radar system of claim 1, wherein the speed determining element is further configured to receive and process radio frequency signals from a global navigation satellite system.

8. (Original) The traffic radar system of claim 1, further comprising a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

9. (Original) The traffic radar system of claim 1, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

10. (Currently Amended) A traffic radar system comprising:
- a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element configured to receive and process radio frequency signals from a global navigation satellite system to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from one of either the first or second electronic signals,
 - receive the speed of the patrol vehicle from the speed determining element,
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a frequency bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - convert the speed of the patrol vehicle to a frequency bin number,
 - form a patrol vehicle speed window that includes a range of frequency bin numbers having the frequency bin number of the converted patrol vehicle speed as a center of the range,
 - ~~identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window,~~
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value,
 - convert one frequency bin number in each group to the relative speed of one target vehicle, and

convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

11. (Original) The traffic radar system of claim 10, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

12. (Original) The traffic radar system of claim 10, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

13. (Original) The traffic radar system of claim 10, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to

determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages, and
determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

14. (Original) The traffic radar system of claim 10, further comprising a display configured to display a plurality of speeds, and the processing element is further

configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

15. (Original) The traffic radar system of claim 10, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

16-20. (Canceled)

21. (New) The traffic radar system of claim 13, wherein the processing element is further configured to set a mode of speed detection to moving when the processing element determines that the patrol vehicle is moving or to stationary when the processing element determines that the patrol vehicle is stationary.

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/137,860		Filing Date 09/21/2018		☐ 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), (i), 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 \$50 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *				x \$230 =					
☐ 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	06/29/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		PRESENT EXTRA		RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0			x \$50 =		0	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0			x \$240 =		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			
* 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".								/DANTE SMITH/			
*** 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.**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446
23589	7590	04/06/2021		
Hovey Williams LLP 10801 Mastin Blvd., Suite 1000 Overland Park, KS 66210			EXAMINER MOORE, WHITNEY	
			ART UNIT	PAPER NUMBER
			3646	
			NOTIFICATION DATE	DELIVERY MODE
			04/06/2021	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):

uspatents@hoveywilliams.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Election/Restrictions

Applicant's election without traverse of Group I (Claims 1-15) in the reply filed on 18 February 2021 is acknowledged. Claims 16-20 have been cancelled by the Applicant.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor (or for applications subject to pre-AIA 35 U.S.C. 112, the applicant), regards as the invention.

Referring to Claim 1, a clarity issue arises with respect to the limitation directed to the speed determining element. It is not clear what is meant by a speed determining element not associated with the patrol vehicle and configured to determine and output a speed of the patrol vehicle. If the speed determining element determines and outputs the speed of the patrol vehicle,

it would seem that it is inherently associated with the vehicle in the sense that it is somehow determining the speed. It is hard to determine what is meant by this limitation in combination with the remaining limitations in the claim. The figures show the speed determining element to be a part of the main radar system 10, and the specification states in [0022] that the system is typically installed in or on a law enforcement patrol vehicle. While the specification also teaches in [0004] that the radar system includes a speed detector that is independent from the patrol vehicle, it is not clear where this detailed or depicted. As there is not part of the disclosure or figures depicting a speed determining element independent or not associated with the patrol vehicle the claim is considered indefinite. Correction/Clarification are required. For purposes of examination, the Examiner interprets the claim to mean using some information not besides the radar elements on the vehicle to determine the patrol vehicle speed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 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 –

(a)(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.

Claim(s) 1-4, 8 and 9 is/are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Aker et al. (Aker, US PGPub 2005/0062642).

Referring to Claim 1, Aker teaches a first radar transceiver (Fig. 3 #308; [0056]) configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam; a second radar transceiver (Fig. 3 #306; [0056]) configured to transmit and receive

radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam; a speed determining element (Fig. 3 #312; [0059]) not associated with the patrol vehicle and configured to determine and output a speed of the patrol vehicle; and a processing element configured to receive a plurality of digital data samples derived from the first or second electronic signals, receive the speed of the patrol vehicle, process the digital data samples to determine a relative speed of at least one target vehicle in the front zone or the rear zone, and convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle; [0055-0067] also see Fig. 8 and related text.

Referring to Claim 2, Aker teaches wherein the processing element is further configured to: perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle, identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window, determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, and convert one frequency bin number in each group to the relative speed of one target vehicle; [0055-0067] as well as Fig. 4 and associated text.

Referring to Claim 3, Aker teaches wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle: add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle, subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and

subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle; [0061].

Referring to Claim 4, Aker teaches wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving; [0059].

Referring to Claim 8, Aker teaches a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle; [0038].

Referring to Claim 9, Aker teaches an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples; [0092].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 and 6 is/are rejected under 35 U.S.C. 103 as being unpatentable over Aker in view of Aker (Aker2, US PGPub 2006/0181449).

Referring to Claims 5 and 6, Aker teaches the speed determining element and the processing element determining if the speed of the patrol vehicle, but does not explicitly disclose nor limit it outputs the patrol vehicle speed in a stream of messages and the processing element is

further configured to determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages (Claim 5) or outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages (Claim 6).

While it is obvious that the method of Aker will determine if the car is moving or stationary based on speed readings, Aker2 better discloses the above determination steps for concluding if the patrol vehicle is moving or not and taking next processing steps based on the conclusion; See Fig. 6A and 6B and the associated text.

Therefore it would have been obvious to one of ordinary skill in the art before the effective filing date of the invention to modify Aker with the processing of Aker2 so as to provide accurate parameters to better determine the speed of a target vehicle.

Claims 7, 10-12, 14 and 15 is/are rejected under 35 U.S.C. 103 as being unpatentable over Aker in view of Okamura et al. (Okamura, US PGPub 2018/0225961).

Referring to Claim 7, Aker teaches the speed determining element, but does not explicitly disclose nor limit it is further configured to receive and process radio frequency signals from a global navigation satellite system.

However, Okamura teaches the speed determining element is further configured to receive and process radio frequency signals from a global navigation satellite system; [0021].

Therefore it would have been obvious to one of ordinary skill in the art before the effective filing date of the invention to modify Aker with the GPS information as taught by Okamura so as to accurately determine position, speed and map information of the vehicle.

Referring to Claim 10, Aker teaches a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam; a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam; a speed determining element configured to determine and output a speed of the patrol vehicle; and a processing element configured to receive a plurality of digital data samples derived from the first or second electronic signals, receive the speed of the patrol vehicle, perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle, identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window, determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, convert one frequency bin number in each group to the relative speed of one target vehicle, and convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle; See citations from the claim set belonging to Claim 1 above, but does not explicitly disclose nor limit the speed determining element is configured to receive and process radio frequency signals from a global navigation satellite system.

However, Okamura teaches the speed determining element is further configured to receive and process radio frequency signals from a global navigation satellite system; [0021].

Therefore it would have been obvious to one of ordinary skill in the art before the effective filing date of the invention to modify Aker with the GPS information as taught by Okamura so as to accurately determine position, speed and map information of the vehicle.

Referring to Claim 11, Aker teaches wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle: add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle, subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle; [0061].

Referring to Claim 12, Aker teaches wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving; [0059].

Referring to Claim 14, Aker teaches a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle; [0038].

Referring to Claim 15, Aker teaches an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples; [0092].

Claims 13 is/are rejected under 35 U.S.C. 103 as being unpatentable over Aker as modified by Okamura in view of Aker2.

Referring to Claim 13, Aker as modified by Okamura teaches the speed determining element but does not explicitly disclose nor limit it outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages, and determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

While it is obvious that the method of Aker will determine if the car is moving or stationary based on speed readings, Aker2 better teaches the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages, and determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages; See Fig. 6A and 6B and the associated text.

Therefore it would have been obvious to one of ordinary skill in the art before the effective filing date of the invention to modify Aker with the processing of Aker2 so as to provide accurate parameters to better determine the speed of a target vehicle.

Note: For applicant's benefit portions of the cited reference(s) have been cited to aid in the review of the rejection(s). While every attempt has been made to be thorough and consistent within the rejection it is noted that the PRIOR ART MUST BE CONSIDERED IN ITS

ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS.

See MPEP 2141.02 VI.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WHITNEY T MOORE whose telephone number is (571)270-3338. The examiner can normally be reached on Monday-Friday from 7am-4pm.

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, Jack Keith can be reached on (571) 272-6878. 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.

/WHITNEY MOORE/
Primary Examiner, Art Unit 3646

<i>Notice of References Cited</i>	Application/Control No. 16/137,860		Applicant(s)/Patent Under Reexamination Shelton, Maurice	
	Examiner WHITNEY T MOORE		Art Unit 3646	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-20050062642-A1	03-2005	Aker, John L.	G01S7/064	342/104
*	B	US-20060181449-A1	08-2006	Aker; John L.	G01S13/92	342/104
*	C	US-20180225961-A1	08-2018	OKAMURA; Toshiyuki	B60R1/00	1/1
	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. 16/137,860	Applicant(s)/Patent Under Reexamination Shelton, Maurice
	Examiner WHITNEY T MOORE	Art Unit 3646

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

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
PE2E-Search (Search History Printout)	04/01/2021	WM
Assignee/Inventor Search	04/01/2021	WM

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

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PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	1	"16137860"	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 01:03 PM
L2	7	"16137860" "16137004" "16151788"	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 01:03 PM
L3	17	("20050253749" "20130307984" "20150219758" "20160103218" "6198427" "7038614").PN.	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 01:03 PM
L4	28	("5400034" "20050062642" "20150219752" "20030058154" "20090002221" "20120280855" "9689969" "20050265124" "5691724" "20060181449").PN.	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 01:03 PM
L5	45	3 OR 4	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 02:03 PM
L6	89	(determin\$3 near2 speed) near5 ((police patrol) near2 (car vehicle))	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 02:03 PM
L7	5	"20110095938"	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 02:03 PM
L8	1	((determin\$3 near2 speed) near5 ((police patrol) near2 (car vehicle))) SAME (GNSS satellite)	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 03:03 PM
L9	31	((speed) near5 ((police patrol) near2 (car vehicle))) SAME (GNSS satellite)	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/03/31 03:03 PM
L10	35	(determin\$3) near5 ((police patrol) near2 (car vehicle)) near5 (moving stationary)	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/04/01 08:04 AM
L11	44	(determin\$3) near5 ((police patrol) near2 (car vehicle)) near5 (moving stationary parked)	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/04/01 08:04 AM

L12	1	((determin\$3) near5 ((police patrol) near2 (car vehicle)) near5 (moving stationary parked)) SAME threshold	(US-PGPUB ; USPAT ; USOCR ; FIT (CN , FR , WO) ; FPRS ; EPO ; JPO ; DERWENT ; IBM_TDB)	OR	ON	ON	2021/04/01 08:04 AM
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PE2E SEARCH - Search History (Interference)

There are no Interference searches to show.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:

SHELTON, Maurice

Serial No.: 16/137,860

Filed: 09/21/2018

TRAFFIC RADAR SYSTEM WITH
PATROL VEHICLE SPEED DETECTION

Docket No.: 50334-US

Group Art Unit No.: 3646

Customer No.: 23589

Confirmation No.: 2446

Examiner: MOORE, Whitney

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

AMENDMENT

In response to the Restriction Requirement dated February 5, 2021, Applicant respectfully submits an election of claims for the above-identified application.

Amendments to the Claims are reflected in the listing of claims, which begins on page 2 of this document.

Remarks begin on page 8 of this document.

Electronic Acknowledgement Receipt

EFS ID:	41954070
Application Number:	16137860
International Application Number:	
Confirmation Number:	2446
Title of Invention:	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION
First Named Inventor/Applicant Name:	Maurice Shelton
Customer Number:	23589
Filer:	Thomas B. Luebbering/Angela Williams
Filer Authorized By:	Thomas B. Luebbering
Attorney Docket Number:	50334-US
Receipt Date:	18-FEB-2021
Filing Date:	21-SEP-2018
Time Stamp:	11:10:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		PTO_Amendment_50334_1660 901-1.PDF	134255 cd1804f6bcb74c429f3b920437ff586b25b37bb8	yes	9

Multipart Description/PDF files in .zip description			
Document Description	Start	End	
Applicant Arguments/Remarks Made in an Amendment	8	9	
Claims	2	7	
Response to Election / Restriction Filed	1	1	
Warnings:			
Information:			
Total Files Size (in bytes):		134255	
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.			

Remarks:

Status of Claims

Claims 1-20 were originally presented with claims 1, 10, and 16 being independent. Claims 16-20 have been canceled. Thus, claims 1-15 are currently presented with claims 1 and 10 being independent.

Office Action

Election/Restriction

The Office Action of February 5, 2021 asserted that restriction to one of the following inventions is required under 35 U.S.C. § 121:

Invention I: Claims 1-15, drawn to a radar system, classified in G01S13/92.

Invention II: Claims 16-20, drawn to a method, classified in G01S7/4052.

Applicant elects, without traverse, to continue examination with Invention I, including claims 1-15. Accordingly, Applicant has canceled claims 16-20.

Conclusion

In the event of further questions, the Examiner is urged to call the undersigned. Any additional fee which might be due in connection with this application should be applied against our Deposit Account No. 19-0522.

Respectfully submitted,

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ATTORNEYS FOR APPLICANT(S)

(Docket No. 50334-US)

Listing of Claims:

1. (Original) A traffic radar system comprising:
 - a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element not associated with the patrol vehicle and configured to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from the first or second electronic signals,
 - receive the speed of the patrol vehicle,
 - process the digital data samples to determine a relative speed of at least one target vehicle in the front zone or the rear zone, and
 - convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.
2. (Original) The traffic radar system of claim 1, wherein the processing element is further configured to:
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, and

convert one frequency bin number in each group to the relative speed of one target vehicle.

3. (Original) The traffic radar system of claim 1, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

4. (Original) The traffic radar system of claim 1, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

5. (Original) The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages.

6. (Original) The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

7. (Original) The traffic radar system of claim 1, wherein the speed determining element is further configured to receive and process radio frequency signals from a global navigation satellite system.

8. (Original) The traffic radar system of claim 1, further comprising a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

9. (Original) The traffic radar system of claim 1, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

10. (Original) A traffic radar system comprising:
- a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element configured to receive and process radio frequency signals from a global navigation satellite system to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from the first or second electronic signals,
 - receive the speed of the patrol vehicle,
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value,
 - convert one frequency bin number in each group to the relative speed of one target vehicle, and
 - convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

11. (Original) The traffic radar system of claim 10, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

12. (Original) The traffic radar system of claim 10, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

13. (Original) The traffic radar system of claim 10, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to

determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages, and
determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

14. (Original) The traffic radar system of claim 10, further comprising a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

15. (Original) The traffic radar system of claim 10, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

16-20. (Canceled)

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/137,860		Filing Date 09/21/2018		☐ 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), (i), 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 \$100 =								
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 = *		x \$460 =								
☐ 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	02/18/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)				
	Total (37 CFR 1.16(i))	* 15	Minus	** 20	= 0	x \$100 =		0				
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	x \$480 =		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				
* 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".						/TARA A WASHINGTON/						
*** 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.
16/137,860	09/21/2018	Maurice Shelton	50334-US	2446
23589	7590	02/05/2021	EXAMINER	
Hovey Williams LLP			MOORE, WHITNEY	
10801 Mastin Blvd., Suite 1000			ART UNIT	PAPER NUMBER
Overland Park, KS 66210			3646	
			NOTIFICATION DATE	DELIVERY MODE
			02/05/2021	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):

uspatents@hoveywilliams.com

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

Election/Restriction

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-15, drawn to a radar system, classified in G01S13/92.

II. Claims 16-20, drawn to method, classified in G01S7/4052.

The inventions are independent or distinct, each from the other because:

Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced by another and materially different process as it does require the usage of multiple transceivers or a speed determining element not associated with the vehicle.

Restriction for examination purposes as indicated is proper because all the inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply: (a) the inventions have acquired a separate status in the art in view of their different classification; (b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter; (c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing

different search queries); (d) the prior art applicable to one invention would not likely be applicable to another invention; (e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph..

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

The examiner has required restriction between product or apparatus claims and process claims. Where applicant elects claims directed to the product/apparatus, and all product/apparatus claims are subsequently found allowable, withdrawn process claims that include all the limitations of the allowable product/apparatus claims should be considered for

rejoinder. All claims directed to a nonelected process invention must include all the limitations of an allowable product/apparatus claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product/apparatus claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product/apparatus are found allowable, an otherwise proper restriction requirement between product/apparatus claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product/apparatus claim will not be rejoined. See MPEP § 821.04. Additionally, in order for rejoinder to occur, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product/apparatus claims. **Failure to do so may result in no rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to WHITNEY T MOORE whose telephone number is (571)270-3338. The examiner can normally be reached on Monday-Friday from 7am-4pm.

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, Jack Keith can be reached on (571) 272-6878. 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.

/WHITNEY MOORE/
Primary Examiner, Art Unit 3646



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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/137,860	09/21/2018	Maurice Shelton	50334-US

CONFIRMATION NO. 2446

PUBLICATION NOTICE



OC000000107338539

23589
Hovey Williams LLP
10801 Mastin Blvd., Suite 1000
Overland Park, KS 66210

Title:TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION

Publication No.US-2019-0107619-A1

Publication Date:04/11/2019

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.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently <https://portal.uspto.gov/pair/PublicPair>. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
16/137,860	09/21/2018	3646	785	50334-US	20	3

CONFIRMATION NO. 2446

FILING RECEIPT



0000000103017501

23589
Hovey Williams LLP
10801 Mastin Blvd., Suite 1000
Overland Park, KS 66210

Date Mailed: 10/16/2018

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)

Maurice Shelton, Buffalo, KS;

Applicant(s)

Kustom Signals, Inc., Lenexa, KS;

Assignment For Published Patent Application

Kustom Signals, Inc., Lenexa, KS

Power of Attorney: The patent practitioners associated with Customer Number 23589

Domestic Priority data as claimed by applicant

This appln claims benefit of 62/569,667 10/09/2017
and claims benefit of 62/569,923 10/09/2017
and claims benefit of 62/570,446 10/10/2017

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: Yes

Permission to Access Search Results: Yes

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: 10/12/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/137,860**

Projected Publication Date: 04/11/2019

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION

Preliminary Class

342

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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.

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 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

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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).

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/137,860				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR 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	75		N/A				
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A	330		N/A				
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		N/A				
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *	x 50 =	0.00	OR					
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3	minus 3 = *	x 230 =	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						
			TOTAL	785		TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	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	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	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.										

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Application of:	Docket No.: 50334-US
SHELTON, Maurice	Confirmation No.:
Serial No.:	Group Art Unit:
Filed:	Customer No.: 23589
Title: TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION	Examiner:

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

Dear Sir:

POWER OF ATTORNEY AND STATEMENT UNDER 37 C.F.R. § 3.73

The Owner of the entire right, title, and interest in the above-referenced application is Kustom Signals, Inc. (hereinafter "Assignee"), a Kansas corporation, with its principal place of business at 9652 Loiret Boulevard, Lenexa, KS 66219. The undersigned, has the authority to sign on behalf of Assignee.

An assignment of the above-referenced application from the inventor, Maurice Shelton, is attached hereto.

Assignee hereby appoints the attorneys and agents of Hovey Williams LLP, associated with Customer Number:

23589

as its attorneys and agents for the purpose of receiving all future correspondence in connection with said patent application and transacting all business in the United States Patent and Trademark Office with respect to said patent application.

Those attorneys and agents are presently:

John M. Collins	26,262	Joan Optican Herman	31,968
Thomas B. Luebbering	37,874	Randall W. Schwartz	46,482
Andrew G. Colombo	40,565	Crissa A. Cook	64,054
Scott R. Brown	40,535	Jessica Collins	61,642
Tracy L. Bornman	42,347	Richard G. Rozier	63,981
Michael B. Hurd	32,241	Paul J. Walker	59,283
Kameron D. Kelly	44,181	Matthew B. Walters	65,343
Gregory J. Skoch	48,267	Dane A. Schad	72,890
Chad A. Kyle	72,340	Lisa M. Martin	70,762
Kyle J. Mendenhall	75,106	Christopher W. Dawson	70,983
Stephen J. Huggins	65,533	Darin L. McCollum	71,515

Kustom Signals Inc.

By: 
Chris Abel, Acting President

9/21/18
DATE

(DOCKET NO. 50333-US)

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	50334-US
		Application Number	
Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		
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		
	Maurice		Shelton			
Residence Information (Select One) • ☒ US Residency ☐ Non US Residency ☐ Active US Military Service						
City	Buffalo	State/Province	KS	Country of Residence	US	
Mailing Address of Inventor:						
Address 1	17227 2300 Road					
Address 2						
City	Buffalo	State/Province	KS			
Postal Code	66717	Country	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	23589
Email Address	Add Email Remove Email

Application Information:

Title of the Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		
Attorney Docket Number	50334-US	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	50334-US
		Application Number	
Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		

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	23589		

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)
	Claims benefit of provisional	62569667	2017-10-09

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	50334-US
		Application Number	
Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	62569923	2017-10-09
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	62570446	2017-10-10
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).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ⁱ (if applicable)	Remove
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

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	50334-US
		Application Number	
Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		

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.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	50334-US
		Application Number	
Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		

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. Clear		
☒ 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	Kustom Signals, Inc.	
Mailing Address Information For Applicant:		
Address 1	9652 Loiret Boulevard	
Address 2		
City	Lenexa	State/Province
Country	US	Postal Code
Phone Number		Fax Number
Email Address		
Additional Applicant Data may be generated within this form by selecting the Add button. Add		

Assignee Information including Non-Applicant Assignee Information:

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	50334-US
		Application Number	
Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		

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. ☒			
Organization Name	Kustom Signals, Inc.		
Mailing Address Information For Assignee including Non-Applicant Assignee:			
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Country i	US	Postal Code	66219
Phone Number		Fax Number	
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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	/Thomas B. Luebbering/		Date (YYYY-MM-DD)	2018-09-21	
First Name	Thomas	Last Name	Luebbering	Registration Number	37874
Additional Signature may be generated within this form by selecting the Add button. Add					

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	50334-US
		Application Number	
Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION		

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.**

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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.
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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.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		TRAFFIC RADAR SYSTEM SITH PATROL VEHICLE SPEED DETECTION		
First Named Inventor/Applicant Name:		Maurice Shelton		
Filer:		Thomas B. Luebbering/Rachel Nichols		
Attorney Docket Number:		50334-US		
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	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				785

Electronic Acknowledgement Receipt

EFS ID:	33790996
Application Number:	16137860
International Application Number:	
Confirmation Number:	2446
Title of Invention:	TRAFFIC RADAR SYSTEM SITH PATROL VEHICLE SPEED DETECTION
First Named Inventor/Applicant Name:	Maurice Shelton
Customer Number:	23589
Filer:	Thomas B. Luebbering/Rachel Nichols
Filer Authorized By:	Thomas B. Luebbering
Attorney Docket Number:	50334-US
Receipt Date:	21-SEP-2018
Filing Date:	
Time Stamp:	12:46:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 785
RAM confirmation Number	092118INTEFSW00017827190522
Deposit Account	190522
Authorized User	Rachel Nichols

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		PTO_Application_50334-US_1171128-1.PDF	123272	yes	31
			f48bc076aa465b37d35c554ca418f3abe1b09b5f		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	22	
	Claims		23	30	
	Abstract		31	31	
Warnings:					
Information:					
2	Drawings-only black and white line drawings	PTO_Drawings_50334-US_1171130-1.PDF	63665	no	8
			601575f1861b63294cb19f023febcb44c10f1babf		
Warnings:					
Information:					
3	Oath or Declaration filed	PTO_Declaration_50334-US_1170775-1.PDF	622709	no	1
			0329a5b90487a3709ad2fec4098bd2c7a1913c03		
Warnings:					
Information:					
4	Power of Attorney	PTO_POA_50334-US_1171162-1.PDF	1129690	no	2
			4fa95911f8c51061790471f5b86720c0714cac5f		
Warnings:					
Information:					
5	Assignee showing of ownership per 37 CFR 3.73	PTO_373c_Stmt_50334-US_1171159-1.PDF	116892	no	3
			6fa01ef1ce98e66fcf2001a5db82e1cea0fbc306		

Warnings:					
Information:					
6	Miscellaneous Incoming Letter	PTO_Assignment_50334-US_1171168-1.PDF	1043110 6572742dde8e7fb5dbc6bd0c916b58bce0831154	no	2
Warnings:					
Information:					
7	Application Data Sheet	PTO_ADS1_50334-US_1171150-1.PDF	1256020 7851af593593e1db615b1fa65fd3dab730bac437	no	8
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	35172 a7a3df78650f659a2f914ef8c5baba1e29dc7db6	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			4390530		
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.					

TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION

RELATED APPLICATIONS

[0001] The current patent application is a non-provisional application which claims priority benefit to U.S. Provisional Application No. 62/569667, entitled “TRAFFIC RADAR SYSTEM WITH MULTIPLE ZONE TARGET DETECTION”, and filed October 9, 2017; U.S. Provisional Application No. 62/569923, entitled “GPS ASSISTED PATROL SPEED SEARCH FOR DSP TRAFFIC RADAR”, and filed October 9, 2017; and U.S. Provisional Application No. 62/570446, entitled “TRAFFIC RADAR SYSTEM WITH ELECTRONIC TUNING FORK TEST FEATURE”, and filed October 10, 2017. The earlier-filed provisional applications are hereby incorporated by reference in their entireties into the current application.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0002] Embodiments of the current invention relate to radar systems that include patrol vehicle speed detectors to help determine target vehicle speeds.

DESCRIPTION OF THE RELATED ART

[0003] Traffic radio and ranging (radar) systems that are implemented in law enforcement patrol vehicles typically include at least one radar transceiver that transmits a radar beam and receives reflections of the radar beam as it bounces off of target vehicles in a zone. The received reflections of the radar beam are converted to an electronic signal which is processed to determine the speeds of the target vehicles, which may then be displayed on a display. When using various techniques to determine target vehicle speeds, it is necessary to know the speed of the patrol vehicle. Prior art traffic radar systems have accessed the patrol vehicle speed from the patrol vehicle itself. But, connecting the traffic radar system to the patrol vehicle's speed detection electronics may be difficult and time consuming. Furthermore, each patrol vehicle make and/or model may use a different protocol to output the patrol vehicle's speed, thereby requiring multiple software or firmware interfaces for the traffic radar system to properly receive the patrol vehicle speed from different vehicles.

SUMMARY OF THE INVENTION

[0004] Embodiments of the current invention solve the above-mentioned problems and provide a distinct advance in the art of traffic radar systems. An exemplary traffic radar system includes a patrol vehicle speed detector that is independent from the patrol vehicle and thus requires no connection to the patrol vehicle and no specific vehicle software or firmware interface.

[0005] The traffic radar system comprises a first radar transceiver, a second radar transceiver, a speed determining element, and a processing element. The first radar transceiver is configured to transmit and receive radar beams from a front zone corresponding to area in front of a patrol vehicle. The first radar transceiver is further configured to generate a first electronic signal corresponding to the received radar beam. The second radar transceiver is configured to transmit and receive radar beams from a rear zone corresponding to area behind the patrol vehicle. The second radar transceiver is further configured to generate a second electronic signal corresponding to the received radar beam. The speed determining element is configured to determine and output a speed of the patrol vehicle. The processing element is configured to receive a plurality of digital data samples derived from the first or second electronic signals, receive the speed of the patrol vehicle, process the digital data samples to determine a relative speed of at least one target vehicle in the front zone or the rear zone, and convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

[0006] Another embodiment of the invention provides a traffic radar system comprising a first radar transceiver, a second radar transceiver, a speed determining element, and a processing element. The first radar transceiver is configured to transmit and receive radar beams from a front zone corresponding to area in front of a patrol vehicle. The first radar transceiver is further configured to generate a first electronic signal corresponding to the received radar beam. The second radar transceiver is configured to transmit and receive radar beams from a rear zone corresponding to area behind the patrol vehicle. The second radar transceiver is further configured to generate a second electronic signal corresponding to the received radar beam. The speed determining element is configured to receive and process radio frequency signals from a global navigation satellite system to determine and output a speed of the patrol vehicle. The

processing element is configured to receive a plurality of digital data samples derived from the first or second electronic signals, receive the speed of the patrol vehicle, perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle, identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window, determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, convert one frequency bin number in each group to the relative speed of one target vehicle, and convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

[0007] Yet another embodiment of the invention provides a computer-implemented method for determining speeds of target vehicles using a traffic radar system. The method comprises receiving a speed of a patrol vehicle from a speed determining element; receiving a plurality of digital data samples derived from radar transceiver signals; processing the digital data samples to determine a relative speed of at least one target vehicle in a front zone relative to the patrol vehicle or the rear zone relative to the patrol vehicle; and converting the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

[0008] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter. Other aspects and advantages of the current invention will be apparent from the following detailed description of the embodiments and the accompanying drawing figures.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

[0009] Embodiments of the current invention are described in detail below with reference to the attached drawing figures, wherein:

[0010] FIG. 1 is a schematic block diagram illustrating electronic components of a traffic radar system, constructed in accordance with various embodiments of the current invention;

[0011] FIG. 2 is an environmental top view of a law enforcement patrol vehicle and a target vehicle, the law enforcement patrol vehicle is equipped with the traffic radar system which includes a front radar transceiver generating a first radar beam and a rear radar transceiver generating a second radar beam;

[0012] FIG. 3 is a schematic block diagram illustrating electronic components of the front radar transceiver assembly;

[0013] FIG. 4 is a schematic block diagram illustrating electronic components of the rear radar transceiver assembly;

[0014] FIG. 5 is an example of a satellite data message output by a speed determining element;

[0015] FIG. 6 is a table explaining a format of the satellite data message;

[0016] FIG. 7 is a plot of relative magnitude vs. frequency resulting from a fast Fourier transform calculation performed on data from the front radar transceiver and the rear radar transceiver;

[0017] FIG. 8 is a front view of at least a portion of a display of a main unit of the traffic radar system;

[0018] FIG. 9 is a table explaining a format of a data packet that is stored in non-volatile memory during a data logging event; and

[0019] FIGs. 10A and 10B include a listing of at least a portion of the steps of a computer-implemented method for determining speeds of target vehicles.

[0020] The drawing figures do not limit the current invention to the specific embodiments disclosed and described herein. The drawings are not necessarily to scale, emphasis instead being placed upon clearly illustrating the principles of the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0021] The following detailed description of the invention references the accompanying drawings that illustrate specific embodiments in which the invention can be practiced. The embodiments are intended to describe aspects of the invention in

sufficient detail to enable those skilled in the art to practice the invention. Other embodiments can be utilized and changes can be made without departing from the scope of the present invention. The following detailed description is, therefore, not to be taken in a limiting sense. The scope of the present invention is defined only by the appended claims, along with the full scope of equivalents to which such claims are entitled.

[0022] Referring to FIGs. 1 and 2, a traffic radar system 10, constructed in accordance with various embodiments of the current invention, broadly comprises a front radar transceiver 12, a rear radar transceiver 14, a display 16, a switch 18, an analog-to-digital converter (ADC) 20, a speed determining element 22, a memory element 24, a processing element 26, and a remote control 28. The traffic radar system 10 is typically installed in or on a law enforcement patrol vehicle 30 and is utilized to monitor the speeds of (target) vehicles 32 on a roadway.

[0023] The display 16, the switch 18, the ADC 20, the speed determining element 22, the memory element 24, and the processing element 26 generally form a main unit 34. The main unit 34 may include additional components not shown in the figures and not discussed in greater detail. The additional components may include a housing to retain the electronic circuits, a communication element to provide wired or wireless communication with other devices, a user interface to allow users to operate the system 10, and so forth. The housing may also include a mount or hardware to mount the main unit 34 in or on the vehicle dashboard or center console.

[0024] The front radar transceiver 12 generally transmits and receives radio frequency (RF) electromagnetic radiation for a radio detection and ranging (radar) application. The front radar transceiver 12 may include a transmitter 36A, a receiver 38A, and an antenna 40A, as shown in FIG. 3. The transmitter 36A may include electronic signal transmitting circuits, such as oscillators, mixers, frequency multipliers, filters, amplifiers, impedance matchers, and the like. The transmitter 36A generates a first RF electronic signal with an exemplary frequency of approximately 35.5 gigahertz (GHz), which is in the Ka band of radar frequency band classification. The transmitter 36A may receive a signal or data input that triggers it to generate the first RF electronic signal. Or, the transmitter 36A may generate the first RF electronic signal on a regular, periodic basis.

[0025] The receiver 38A may include electronic signal receiving circuits, such as oscillators, mixers, matched filters, amplifiers, and the like. The receiver 38A may receive a second RF electronic signal that includes reflection data resulting from reflections of a radar beam off of objects in the vicinity of the front radar transceiver 12. The receiver 38A may generate a front radar output electronic signal that has a lower frequency and still includes the reflection data. In various embodiments, the front radar output electronic signal has a dual complex or quadrature (I/Q) format. The front radar output electronic signal is communicated to the main unit 34.

[0026] The antenna 40A generally transmits a first radar beam 42 and receives reflections of the radar beam 42 as it reflects from target vehicles 32. When the antenna 40A receives the first RF electronic signal from the transmitter 36A, it transmits the first radar beam 42, that is, radio wave electromagnetic radiation forming the radar beam having an exemplary frequency of approximately 35.5 GHz. When the antenna 40A receives reflections of the first radar beam 42, it generates the second RF electronic signal. The antenna 40A may be embodied by directional antennas such as a parabolic antennas. The antenna 40A may transmit the first radar beam 42 as shown in FIG. 2, wherein the first radar beam 42 may have a width of approximately 12 degrees. The front radar transceiver 12 may be mounted or installed on the forward portion of the patrol vehicle, such as a hood, a grill, or a front bumper of the vehicle. Thus, the first radar beam 42 is transmitted in front of the patrol vehicle, also known as the “front zone”.

[0027] Referring to FIG. 4, the rear radar transceiver 14 includes a transmitter 36B, a receiver 38B, and an antenna 40B, each of which is substantially identical in structure and function to the like-named components described above for the front radar transceiver 12. The antenna 40B may transmit a second radar beam 44 as shown in FIG. 2, wherein the second radar beam 44 may also have a width of approximately 12 degrees. The receiver 38B may generate a rear radar output electronic signal that varies according to reflections of the second radar beam 44 received by the antenna 40B. In various embodiments, the rear radar output electronic signal has a dual complex or quadrature (I/Q) format. The rear radar output electronic signal is communicated to the main unit 34. The rear radar transceiver 14 may be mounted or installed on the rear portion of the patrol

vehicle, such as a trunk cover or a rear bumper of the vehicle. Thus, the second radar beam 44 is transmitted in the rear of the patrol vehicle, also known as the “rear zone”.

[0028] The display 16 may include video devices of the following types: light-emitting diode (LED), organic LED (OLED), Light Emitting Polymer (LEP) or Polymer LED (PLED), liquid crystal display (LCD), thin film transistor (TFT) LCD, LED side-lit or back-lit LCD, plasma, heads-up displays (HUDs), or the like, or combinations thereof. The display 16 may include a screen on which the information is presented, with the screen possessing a square or a rectangular aspect ratio that may be viewed in either a landscape or a portrait mode. In various embodiments, the display 16 may also include a touch screen occupying the entire screen or a portion thereof so that the display 16 functions as part of a user interface. The touch screen may allow the user to interact with the main unit 34 by physically touching, swiping, or gesturing on areas of the screen.

[0029] The switch 18 may have a double pole, double throw (DPDT) configuration with a first pair of input contacts, a second pair of input contacts, and a pair of output contacts. The first input contacts are electrically connected to the front radar transceiver 12 and receive the front radar output electronic signal. The second input contacts are electrically connected to the rear radar transceiver 14 and receive the rear radar output electronic signal. The output contacts may be electrically connected to the ADC 20. The switch 18 may operate in one of two modes. In a first mode, the output contacts receive the front radar output electronic signal. In a second mode, the output contacts receive the rear radar output electronic signal. Selection of the mode is controlled by a switch control signal from the processing element 26.

[0030] The ADC 20 receives the front radar output electronic signal or the rear radar output electronic signal from the switch 18. The ADC 20 includes electronic circuitry that converts the analog electrical characteristics of the front radar output electronic signal or the rear radar output electronic signal to a corresponding stream of sampled digital data, which includes a plurality of samples, each sample representing a value of the signal. The ADC 20 communicates the sampled digital data stream of the front radar output electronic signal or the rear radar output electronic signal to the memory element 24, the processing element 26, or both.

[0031] The speed determining element 22 generally determines a speed of the main unit 34 and by extension, the patrol vehicle 30. The speed determining element 22 may receive and process radio frequency (RF) signals from a multi-constellation global navigation satellite system (GNSS) such as the global positioning system (GPS), the GLONASS system, the Galileo system, the quasi-zenith satellite system (QZSS), and so forth. The speed determining element 22 may also may receive and process RF signals from telecommunications networks that provide or utilize Assisted GPS (A-GPS). The speed determining element 22 may accompany or include an antenna to assist in receiving the satellite signals. The antenna may be a patch antenna, a linear antenna, or any other type of antenna that can be used with location or navigation devices. The speed determining element 22 may include satellite navigation receivers, processors, controllers, other computing devices, or combinations thereof, and memory. An exemplary speed determining element 22 is embodied by the SE868K3-A GNSS module from Telit Wireless Solutions of London, England UK. The speed determining element 22 may determine or receive positioning or geolocation information from GNSS constellations at regular intervals over time and thus is operable to determine speed, or speed over ground, as well as heading, or course over ground. The speed determining element 22 communicates the patrol vehicle speed to the processing element 26, the memory element 24, or both. The patrol vehicle speed, along with other data, is output in a satellite data message at regular intervals from the speed determining element 22.

[0032] The memory element 24 may be embodied by devices or components that store data in general, and digital or binary data in particular, and may include exemplary electronic hardware data storage devices or components such as read-only memory (ROM), programmable ROM, erasable programmable ROM, random-access memory (RAM) such as static RAM (SRAM) or dynamic RAM (DRAM), cache memory, hard disks, floppy disks, optical disks, flash memory, thumb drives, universal serial bus (USB) drives, or the like, or combinations thereof. In some embodiments, the memory element 24 may be embedded in, or packaged in the same package as, the processing element 26. The memory element 24 may include, or may constitute, a “computer-readable medium”. The memory element 24 may store the instructions, code, code statements, code segments, software, firmware, programs, applications, apps, services, daemons, or the like that are

executed by the processing element 26. The memory element 24 may also store data that is received by the processing element 26 or the device in which the processing element 26 is implemented. The processing element 26 may further store data or intermediate results generated during processing, calculations, and/or computations as well as data or final results after processing, calculations, and/or computations. In addition, the memory element 24 may store settings, data, documents, sound files, photographs, movies, images, databases, and the like.

[0033] The processing element 26 may comprise one or more processors. The processing element 26 may include electronic hardware components such as microprocessors (single-core or multi-core), microcontrollers, digital signal processors (DSPs), field-programmable gate arrays (FPGAs), analog and/or digital application-specific integrated circuits (ASICs), or the like, or combinations thereof. The processing element 26 may generally execute, process, or run instructions, code, code segments, code statements, software, firmware, programs, applications, apps, processes, services, daemons, or the like. The processing element 26 may also include hardware components such as registers, finite-state machines, sequential and combinational logic, and other electronic circuits that can perform the functions necessary for the operation of the current invention. In certain embodiments, the processing element 26 may include multiple computational components and functional blocks that are packaged separately but function as a single unit. The processing element 26 may be in electronic communication with the other electronic components through serial or parallel links that include universal busses, address busses, data busses, control lines, and the like. The processing element 26 may be operable, configured, or programmed to perform the following functions by utilizing hardware, software, firmware, or combinations thereof.

[0034] Before normal operation begins, the processing element 26 may execute an initialization process by first initializing its own input/output ports. Then, the processing element 26 initializes the speed determining element 22 by sending a series of command messages to the speed determining element 22 to set the format of output from the speed determining element 22 and improve its performance. The processing element 26 communicates a first command to the speed determining element 22 that sets a format of its satellite data message to an RMC message, or Recommended Minimum Specific

GNSS data. This reduces the amount of data included in each satellite data message from the speed determining element 22. The processing element 26 communicates a second command to the speed determining element 22 that decreases the time period between position fixes, which is when the speed determining element 22 determines its position, speed, and other data that is included in the satellite data message. The second command has the effect of increasing the number of satellite data messages that the speed determining element 22 can produce per second. An example of the second command sets the time period to 200 milliseconds, thereby setting the satellite data message rate to 5 times per second. The processing element 26 communicates a third command to the speed determining element 22 that increases the bit communication rate output by the speed determining element 22. Thus, each time the speed determining element 22 outputs the satellite data message, it generates the message more quickly. Other command messages may be sent to the speed determining element 22 to further customize the data output.

[0035] An example of the RMC-format satellite data message that is output from the speed determining element 22 is shown in FIG. 5. An explanation of the contents of the satellite data message is shown in the table of FIG. 6. The table includes three columns: a first column that lists a plurality of fields that are included in each message, a second column that lists an example of each field, and a third column that lists a description of each field or optional values that could be included in each field. One of the fields in the satellite data message is “Speed Over Ground”, which is the speed of the patrol vehicle 30 around the time that the satellite data message is generated.

[0036] Once the speed determining element 22 has been properly initialized, it communicates the satellite data message, with the format shown in FIG. 5, to the processing element 26 and/or the memory element 24 at a rate of 5 messages per second. The processing element 26 receives the satellite data message and parses it to retrieve the value of the Speed Over Ground field, which is the patrol vehicle speed. Since the Speed Over Ground is recorded by the speed determining element 22 in units of knots, the processing element 26 converts the value to units of miles per hour (mph) and kilometers per hour (km/h or kph). Based on the value of the patrol vehicle speed, the processing element 26 sets a mode of speed detection to either “stationary”, if the patrol

vehicle speed is less than a first threshold speed for at least four consecutive satellite data messages, or “moving”, if the patrol vehicle speed is greater than a second threshold speed for at least four consecutive satellite data messages. An exemplary first threshold speed is 1.1 mph. An exemplary second threshold speed is 3.1 mph.

[0037] The main unit 34 operates in one of three modes – a front zone mode, a rear zone mode, and a scan mode. The mode is selected by a user, typically a law enforcement officer, who selects the mode from the user interface of the main unit 34. In the front zone mode, the processing element 26 outputs the switch control signal at a first level to set the switch 18 in the first mode such that the processing element 26 and the memory element 24 receive a plurality of front radar digital data samples from the ADC 20. In the rear zone mode, the processing element 26 outputs the switch control signal at a second level to set the switch 18 in the second mode such that the processing element 26 and the memory element 24 receive a plurality of rear radar digital data samples from the ADC 20. In the scan mode, the processing element 26 outputs the switch control signal at the first level to set the switch 18 in the first mode for a first period of time and then outputs the switch control signal at the second level to set the switch 18 in the second mode for a second period of time such that the processing element 26 and the memory element 24 receive the front radar digital data samples for the first period of time and the rear radar digital data samples for the second period of time. The processing element 26 then toggles the level of the switch control signal between the first level and the second level in order to toggle the mode of the switch 18 between the first mode and the second mode. Thus, the processing element 26 and the memory element 24 repeatedly receive the front radar digital data samples for the first period of time and the rear radar digital data samples for the second period of time. Typically, the first period of time is the amount of time necessary for the processing element 26 and the memory element 24 to receive a certain, predetermined number of front radar digital data samples, while the second period of time is the amount of time necessary for the processing element 26 and the memory element 24 to receive a certain, predetermined number of rear radar digital data samples.

[0038] Whether the main unit 34 is in the front zone mode, the rear zone mode, or the scan mode, once the processing element 26 and the memory element 24 receive the

predetermined number of front radar digital data samples or rear radar digital data samples, the processing element 26 performs a time domain to frequency domain conversion on the time-domain-based front or rear radar digital data samples. The processing element 26 may utilize a discrete Fourier transform (DFT), a fast Fourier transform (FFT), or the like. Exemplary embodiments utilize the FFT. Thus, the predetermined number of front or rear radar digital data samples is an amount of samples necessary for the processing element 26 to perform an M-point FFT, where M is a 2^n value, such as 256, 512, 1024, etc. The FFT calculation produces a plurality of frequency bins, each frequency bin associated with a bin number and having a relative magnitude value. In addition, each frequency bin may correspond, or relate, to a speed of a vehicle. A plot 46 of the result of a random FFT calculation, i.e., relative magnitude vs. frequency bin, is shown in FIG. 7. Generally, the reflection of the radar beam off of each target vehicle 32 produces a spike 48 in the relative magnitude for a small number of adjacent frequency bins in the plot 46 – the spike 48 being values of the relative magnitude greater than a predetermined spike threshold. The processing element 26 may examine the relative magnitude associated with each frequency bin number and compare the relative magnitude with the spike threshold. If the relative magnitude is above the spike threshold for a group (e.g., four or five) of successive bin numbers, then the processing element 26 determines that the frequency bin numbers include a spike 48. The location of the spike 48, i.e., the numbers of the frequency bins with the relative magnitude above the spike threshold, corresponds to, or varies according to, the relative speed of the target vehicle 32.

[0039] In addition, the reflection of the radar beam off surrounding terrain relative to the patrol vehicle 30 produces a spike 50 in the plot 46. This must be accounted for when analyzing the relative magnitude data to determine the speeds of target vehicles 32. The processing element 26 converts the Speed Over Ground speed value of the patrol vehicle 30 (from the speed determining element 22) to a frequency bin number. The processing element 26 may also create a patrol vehicle speed window 52, which includes the bin numbers that correspond to the converted patrol vehicle speed frequency bin number plus 5 mph and minus 5 mph. The processing element 26 identifies the patrol vehicle spike 50 by determining which spike lies within the patrol vehicle speed window

52. Hence, the processing element 26 determines that the other spikes 48 outside of the patrol vehicle speed window 52 belong to target vehicles 32. In the exemplary plot 46 of FIG. 7, there is a first spike that is a target vehicle spike 48 and a second spike that is a patrol vehicle spike 50 and exists within the patrol vehicle speed window 52.

[0040] The processing element 26 converts the frequency bin numbers for each spike 48 to a target vehicle speed in units of miles per hour or kilometers per hour. In various embodiments, the processing element 26 may convert the frequency bin number with the greatest relative magnitude to a target vehicle speed for each spike 48. If the patrol vehicle 30 is in stationary mode, then the target vehicle speed, that was just converted, is an absolute, or actual, target vehicle speed. If the patrol vehicle 30 is in moving mode, then the target vehicle speed is a speed relative to the speed of the patrol vehicle 30. The absolute target vehicle speed is determined by further mathematical operations, such as adding the target vehicle speed to the patrol vehicle speed, subtracting the target vehicle speed from the patrol vehicle speed, or subtracting the patrol vehicle speed from the target vehicle speed. The choice of mathematical operation may depend on whether the target vehicle 32 and the patrol vehicle 30 are traveling the same direction or the opposite directions or whether the patrol vehicle 30 is traveling faster or slower than the target vehicle 32, or alternatively, whether the target vehicle 32 is getting closer to, or moving away from, the patrol vehicle 30. The processing element 26 may analyze phase data produced by the FFT calculation, not shown in the figures, in order to determine which mathematical operation to perform in order to determine the absolute speed of the target vehicles 32. After analyzing the phase data, the processing element 26 determines the absolute target vehicle speed for each spike 48 in the relative magnitude data.

[0041] When the absolute speed of all of the target vehicles 32 has been determined, the processing element 26 controls the display to display the speeds. Typically, the target vehicle speed with the greatest magnitude (the strongest speed) is displayed along with the patrol vehicle speed. An example of at least a portion of the display 16 of the main unit 34 is shown in FIG. 8. The display 16 includes a patrol vehicle speed indication 54 and a target vehicle speed indication 56. The display 16 also includes a verification indicia 58, in this case a check mark, that indicates the speed displayed in

the patrol vehicle speed indication 54 is verified by the speed determining element 22, which is independent from the speed of the patrol vehicle 30 provided by the patrol vehicle 30 radar Doppler return. The display 16 may further include a first label "FRONT" indicating the target vehicle 32 whose speed is displayed in the target vehicle speed indication 56 is in the front zone. The display may also include a second label "REAR", not shown in the figures, which indicates that the target vehicle 32 whose speed is displayed in the target vehicle speed indication 56 is in the rear zone. In addition, the display 16 may include a target vehicle icon 60 whose position, relative to the patrol vehicle speed indication 54, indicates the position of the target vehicle 32 relative to the patrol vehicle 30. For example, the target vehicle icon 60 being positioned above the patrol vehicle speed indication 54 indicates that the target vehicle 32 is in the front zone. The target vehicle icon 60 being positioned below the patrol vehicle speed indication 54 indicates that the target vehicle 32 is in the rear zone.

[0042] The processing element 26 may complete the target vehicle speed determination process multiple times per second, wherein the process includes: receiving the Speed Over Ground of the patrol vehicle 30 from the speed determining element 22, converting the speed to units of miles per hour, receiving front or rear radar digital data samples, converting the radar digital data samples to frequency domain data, determining the patrol vehicle speed window 52, determining frequency bin spikes 48 that are located outside the patrol vehicle speed window 52, converting the frequency bin spikes 48 to target vehicle speeds, and controlling the display 16 to display the target vehicle speeds.

[0043] The processing element 26 receives input from the user interface of the main unit 34. The operator (typically a law enforcement officer) may lock the speed readings, for example when the processing element 26 has determined a target vehicle speed that is over the speed limit. Locking the speed readings captures and stores the current target and patrol speed readings to prevent potentially losing the speed values that indicated the target speed was exceeding the speed limit as the target speeds update during normal operation. The processing element 26 then performs an event data storage. The event data storage may be performed in other circumstances as well, such as running a system test, an occurrence of a system error, updating of the system firmware, and so forth. The event data storage may include storing a data packet in non-

volatile memory in the memory element 24 or transmitting the data packet to an external device, system, server, or the like. An example of the data packet is shown in FIG. 9 and may include a plurality of data fields. A first field is a record number which is unique for each data packet. A second field is a record type which identifies the type of event that caused the data packet to be created. In the example, the record type is “locked speeds event”. A third field is a universal time when the data packet was created. A fourth field is a date when the data packet was created. A fifth field is a geolocation of the patrol vehicle 30 when the data packet was created. The geolocation may be stored in units of latitude and longitude and may be derived from the satellite data message generated by the speed determining element 22. A sixth field is a course, or heading, of the patrol vehicle 30 when the data packet was created. The course may also be derived from the satellite data message generated by the speed determining element 22. A seventh field is a patrol vehicle speed which is determined as described above. An eighth field is a target vehicle speed which is also determined as described above. A ninth field is an operating mode describing the mode of speed detection and direction of travel of the target vehicle 32 relative to the patrol vehicle 30. In the example, the mode is “moving same direction”.

[0044] The remote control 28 generally provides control of the operation of the traffic radar system 10. The remote control 28 may be packaged in a hand held package, may be mounted on the steering wheel or center console of the patrol vehicle 30, or may be implemented as a software application running on a mobile electronic device, such as a smart phone, a tablet computer, or the like. The remote control 28 may communicate with the main unit 34 through a wired cable connection or wirelessly through infrared (IR) signaling or radio frequency (RF) signaling, such as Bluetooth™, cellular, WiFi, etc. The remote control 28 may include a keypad-type interface which allows the operator to set the operating mode and other functions of the traffic radar system 10.

[0045] FIGs. 10A and 10B depicts a listing of at least a portion of the steps of an exemplary computer-implemented method 100 for determining speeds of target vehicles 32 using a traffic radar system 10. The steps may be performed in the order shown in FIGs. 10A and 10B, or they may be performed in a different order. Furthermore, some steps may be performed concurrently as opposed to sequentially. In addition, some steps

may be optional or may not be performed. In various embodiments, the steps are performed by the processing element 26 of the main unit 34.

[0046] Referring to step 101, a satellite data message is received from the speed determining element 22. An example of the satellite data message is shown in FIG. 5. And an explanation of the contents of the satellite data message is shown in the table of FIG. 6.

[0047] Referring to step 102, the satellite data message is processed to determine a speed of the patrol vehicle 30. The satellite data message is parsed to find a Speed Over Ground field, and the value of the field is retrieved. The Speed Over Ground value may be in units of knots. The Speed Over Ground value is converted to units of miles per hour (mph) and kilometers per hour (km/h or kph) and set as the patrol vehicle speed.

[0048] Referring to step 103, a mode of speed detection is set according to the patrol vehicle speed. Based on the value of the patrol vehicle speed, the mode of speed detection is set to either “stationary”, if the patrol vehicle speed is less than 1.1 mph for at least four consecutive satellite data messages, or “moving”, if the patrol vehicle speed is greater than 3.1 mph for at least four consecutive satellite data messages.

[0049] Referring to step 104, digitized data samples from the front radar transceiver 12 and the rear radar transceiver 14 are received. The ADC 20 digitizes the front radar output electronic signal to generate the front radar digital data samples and the rear radar output electronic signal to generate the rear radar digital data samples. The digital data samples may be received by the processing element 26 and stored in the memory element 24. Depending on the operating mode of the main unit 34 (front zone mode, rear zone mode, or scan mode), a continuous stream of front radar digital data samples is received, a continuous stream of rear radar digital data samples is received, or alternating streams of front radar digital data samples and rear radar digital data samples are received.

[0050] Referring to step 105, a time domain to frequency domain conversion of the digital data samples is performed. The digital data samples are time-domain data. An exemplary conversion utilizes the FFT. Once enough digital data samples to perform an M-point FFT, where M is a 2^n value, such as 256, 512, 1024, etc. have been received, the FFT is performed. The FFT calculation produces a plurality of frequency bins, each

frequency bin being numbered and having a relative magnitude value. A plot 46 of the result of a random FFT calculation, i.e., relative magnitude vs. frequency bin, is shown in FIG. 7. Generally, the reflection of the radar beam off of each target vehicle 32 produces a spike 48 in the relative magnitude for a small number of adjacent frequency bin in the plot 46 – the spike 48 being values of the relative magnitude greater than a predetermined spike threshold. The relative magnitude associated with each frequency bin number is compared with the spike threshold. If the relative magnitude is above the spike threshold for a predetermined quantity (e.g., four or five) of bin numbers in a row, then it is determined that the frequency bin numbers include a spike 48. The location of the spike 48, i.e., the numbers of the frequency bins with the relative magnitude above the spike threshold, corresponds to, or varies according to, the speed of the target vehicle 32.

[0051] Referring to step 106, a patrol vehicle speed window 52 corresponding to the patrol vehicle speed is determined. The reflection of the radar beam off of the surrounding terrain produces a spike 50 in the plot 46. This must be accounted for when analyzing the relative frequency bin data to determine the speeds of target vehicles 32. The processing element 26 converts the Speed Over Ground speed value of the patrol vehicle 30 (from the speed determining element 22) to a frequency bin number. The patrol vehicle speed window 52, as shown in FIG. 7, includes bin numbers that correspond to the converted patrol vehicle speed frequency bin number plus 5 mph and minus 5 mph.

[0052] Referring to step 107, the frequency bins outside of the patrol vehicle speed window 52 with relative magnitudes above the spike threshold are determined. The frequency bins outside of the patrol vehicle speed window 52 may be scanned or examined in succession, with the relative magnitude of each frequency bin being compared to the spike threshold. The successive frequency bin numbers that are greater than the spike threshold are determined to be part of a spike 48 and are associated with the speed of a target vehicle 32.

[0053] Referring to step 108, the target vehicle frequency bins are converted into target vehicle speeds. The frequency bin numbers for each spike 48 are converted to a target vehicle speed in units of miles per hour or kilometers per hour. In various

embodiments, the frequency bin number with the greatest relative magnitude for each spike 48 is converted to a target vehicle speed.

[0054] Referring to step 109, the target vehicle speeds are converted to absolute target vehicle speeds. If the patrol vehicle 30 is in stationary mode, then the target vehicle speed is an absolute, or actual, target vehicle speed. If the patrol vehicle 30 is in moving mode, then the target vehicle speed is a speed relative to the speed of the patrol vehicle 30. The absolute target vehicle speed is determined by further mathematical operations, such as adding the target vehicle speed to the patrol vehicle speed, subtracting the target vehicle speed from the patrol vehicle speed, or subtracting the patrol vehicle speed from the target vehicle speed. The choice of mathematical operation may depend on whether the target vehicle 32 and the patrol vehicle 30 are traveling the same direction or the opposite directions or whether the patrol vehicle 30 is traveling faster or slower than the target vehicle 32. Phase data produced by the FFT calculation, not shown in the figures, may be analyzed in order to determine which mathematical operation to perform in order to determine the absolute speed of the target vehicles 32. After analyzing the phase data, the absolute target vehicle speed is determined for each spike 48 in the relative magnitude data.

[0055] Referring to step 110, the target vehicle speed and the patrol vehicle speed are displayed. Typically, the target vehicle speed with the greatest magnitude (the strongest speed) is displayed. An example of at least a portion of the display 16 with the patrol vehicle speed indication 54 and the target vehicle speed indication 56 is shown in FIG. 8.

[0056] Referring to step 111, data is stored in the memory element 24. Event data storage may be performed when the speed readings on the display 16 are locked or in other circumstances as well, such as running a system test, an occurrence of a system error, updating of the system firmware, and so forth. The event data storage may include storing a data packet in non-volatile memory in the memory element 24 or transmitting the data packet to an external device, system, server, or the like. An example of the data packet is shown in FIG. 9 and may include the data fields therein.

[0057] In this description, references to “one embodiment”, “an embodiment”, or “embodiments” mean that the feature or features being referred to are included in at least

one embodiment of the technology. Separate references to “one embodiment”, “an embodiment”, or “embodiments” in this description do not necessarily refer to the same embodiment and are also not mutually exclusive unless so stated and/or except as will be readily apparent to those skilled in the art from the description. For example, a feature, structure, act, etc. described in one embodiment may also be included in other embodiments, but is not necessarily included. Thus, the current technology can include a variety of combinations and/or integrations of the embodiments described herein.

[0058] Although the present application sets forth a detailed description of numerous different embodiments, it should be understood that the legal scope of the description is defined by the words of the claims set forth at the end of this patent and equivalents. The detailed description is to be construed as exemplary only and does not describe every possible embodiment since describing every possible embodiment would be impractical. Numerous alternative embodiments may be implemented, using either current technology or technology developed after the filing date of this patent, which would still fall within the scope of the claims.

[0059] Throughout this specification, plural instances may implement components, operations, or structures described as a single instance. Although individual operations of one or more methods are illustrated and described as separate operations, one or more of the individual operations may be performed concurrently, and nothing requires that the operations be performed in the order illustrated. Structures and functionality presented as separate components in example configurations may be implemented as a combined structure or component. Similarly, structures and functionality presented as a single component may be implemented as separate components. These and other variations, modifications, additions, and improvements fall within the scope of the subject matter herein.

[0060] Certain embodiments are described herein as including logic or a number of routines, subroutines, applications, or instructions. These may constitute either software (e.g., code embodied on a machine-readable medium or in a transmission signal) or hardware. In hardware, the routines, etc., are tangible units capable of performing certain operations and may be configured or arranged in a certain manner. In example embodiments, one or more computer systems (e.g., a standalone, client or

server computer system) or one or more hardware modules of a computer system (e.g., a processor or a group of processors) may be configured by software (e.g., an application or application portion) as computer hardware that operates to perform certain operations as described herein.

[0061] In various embodiments, computer hardware, such as a processing element, may be implemented as special purpose or as general purpose. For example, the processing element may comprise dedicated circuitry or logic that is permanently configured, such as an application-specific integrated circuit (ASIC), or indefinitely configured, such as an FPGA, to perform certain operations. The processing element may also comprise programmable logic or circuitry (e.g., as encompassed within a general-purpose processor or other programmable processor) that is temporarily configured by software to perform certain operations. It will be appreciated that the decision to implement the processing element as special purpose, in dedicated and permanently configured circuitry, or as general purpose (e.g., configured by software) may be driven by cost and time considerations.

[0062] Accordingly, the term “processing element” or equivalents should be understood to encompass a tangible entity, be that an entity that is physically constructed, permanently configured (e.g., hardwired), or temporarily configured (e.g., programmed) to operate in a certain manner or to perform certain operations described herein. Considering embodiments in which the processing element is temporarily configured (e.g., programmed), each of the processing elements need not be configured or instantiated at any one instance in time. For example, where the processing element comprises a general-purpose processor configured using software, the general-purpose processor may be configured as respective different processing elements at different times. Software may accordingly configure the processing element to constitute a particular hardware configuration at one instance of time and to constitute a different hardware configuration at a different instance of time.

[0063] Computer hardware components, such as communication elements, memory elements, processing elements, and the like, may provide information to, and receive information from, other computer hardware components. Accordingly, the described computer hardware components may be regarded as being communicatively

coupled. Where multiple of such computer hardware components exist contemporaneously, communications may be achieved through signal transmission (e.g., over appropriate circuits and buses) that connect the computer hardware components. In embodiments in which multiple computer hardware components are configured or instantiated at different times, communications between such computer hardware components may be achieved, for example, through the storage and retrieval of information in memory structures to which the multiple computer hardware components have access. For example, one computer hardware component may perform an operation and store the output of that operation in a memory device to which it is communicatively coupled. A further computer hardware component may then, at a later time, access the memory device to retrieve and process the stored output. Computer hardware components may also initiate communications with input or output devices, and may operate on a resource (e.g., a collection of information).

[0064] The various operations of example methods described herein may be performed, at least partially, by one or more processing elements that are temporarily configured (e.g., by software) or permanently configured to perform the relevant operations. Whether temporarily or permanently configured, such processing elements may constitute processing element-implemented modules that operate to perform one or more operations or functions. The modules referred to herein may, in some example embodiments, comprise processing element-implemented modules.

[0065] Similarly, the methods or routines described herein may be at least partially processing element-implemented. For example, at least some of the operations of a method may be performed by one or more processing elements or processing element-implemented hardware modules. The performance of certain of the operations may be distributed among the one or more processing elements, not only residing within a single machine, but deployed across a number of machines. In some example embodiments, the processing elements may be located in a single location (e.g., within a home environment, an office environment or as a server farm), while in other embodiments the processing elements may be distributed across a number of locations.

[0066] Unless specifically stated otherwise, discussions herein using words such as “processing,” “computing,” “calculating,” “determining,” “presenting,” “displaying,” or

the like may refer to actions or processes of a machine (e.g., a computer with a processing element and other computer hardware components) that manipulates or transforms data represented as physical (e.g., electronic, magnetic, or optical) quantities within one or more memories (e.g., volatile memory, non-volatile memory, or a combination thereof), registers, or other machine components that receive, store, transmit, or display information.

[0067] As used herein, the terms “comprises,” “comprising,” “includes,” “including,” “has,” “having” or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of elements is not necessarily limited to only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus.

[0068] The patent claims at the end of this patent application are not intended to be construed under 35 U.S.C. § 112(f) unless traditional means-plus-function language is expressly recited, such as “means for” or “step for” language being explicitly recited in the claim(s).

[0069] Although the invention has been described with reference to the embodiments illustrated in the attached drawing figures, it is noted that equivalents may be employed and substitutions made herein without departing from the scope of the invention as recited in the claims.

[0070] Having thus described various embodiments of the invention, what is claimed as new and desired to be protected by Letters Patent includes the following:

CLAIMS:

1. A traffic radar system comprising:
 - a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element not associated with the patrol vehicle and configured to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from the first or second electronic signals,
 - receive the speed of the patrol vehicle,
 - process the digital data samples to determine a relative speed of at least one target vehicle in the front zone or the rear zone, and
 - convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.
2. The traffic radar system of claim 1, wherein the processing element is further configured to:
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, and

convert one frequency bin number in each group to the relative speed of one target vehicle.

3. The traffic radar system of claim 1, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

4. The traffic radar system of claim 1, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

5. The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages.

6. The traffic radar system of claim 1, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to determine that the patrol vehicle is stationary when the patrol vehicle

speed is less than a second threshold value for a predetermined number of successive messages.

7. The traffic radar system of claim 1, wherein the speed determining element is further configured to receive and process radio frequency signals from a global navigation satellite system.

8. The traffic radar system of claim 1, further comprising a display configured to display a plurality of speeds, and the processing element is further configured to control the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

9. The traffic radar system of claim 1, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

10. A traffic radar system comprising:
- a first radar transceiver configured to transmit and receive radar beams from a front zone corresponding to an area in front of a patrol vehicle and to generate a first electronic signal corresponding to the received radar beam;
 - a second radar transceiver configured to transmit and receive radar beams from a rear zone corresponding to an area behind the patrol vehicle and to generate a second electronic signal corresponding to the received radar beam;
 - a speed determining element configured to receive and process radio frequency signals from a global navigation satellite system to determine and output a speed of the patrol vehicle; and
 - a processing element configured to
 - receive a plurality of digital data samples derived from the first or second electronic signals,
 - receive the speed of the patrol vehicle,
 - perform a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
 - identify a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window,
 - determine at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value,
 - convert one frequency bin number in each group to the relative speed of one target vehicle, and
 - convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

11. The traffic radar system of claim 10, wherein the processing element is further configured to perform one of the following depending the directions of travel of the patrol vehicle and the target vehicle:

- add the relative speed of the target vehicle to the speed of the patrol vehicle to determine the absolute speed of the target vehicle,
- subtract the relative speed of the target vehicle from the speed of the patrol vehicle to determine the absolute speed of the target vehicle, and
- subtract the speed of the patrol vehicle from the relative speed of the target vehicle to determine the absolute speed of the target vehicle.

12. The traffic radar system of claim 10, wherein the processing element is further configured to determine whether the patrol vehicle is moving or stationary and convert the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

13. The traffic radar system of claim 10, wherein the speed determining element outputs the patrol vehicle speed in a stream of messages and the processing element is further configured to

- determine that the patrol vehicle is moving when the patrol vehicle speed is greater than a first threshold value for a predetermined number of successive messages, and
- determine that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

14. The traffic radar system of claim 10, further comprising a display configured to display a plurality of speeds, and the processing element is further configured to control

the display to display the speed of the patrol vehicle and the absolute speed of the target vehicle.

15. The traffic radar system of claim 10, further comprising an analog to digital converter configured to receive the first electronic signal and the second electronic signal and output a plurality of front radar digital data samples and a plurality of rear radar digital samples.

16. A computer-implemented method for determining speeds of target vehicles using a traffic radar system, the method comprising:

receiving a speed of a patrol vehicle from a speed determining element;
receiving a plurality of digital data samples derived from radar transceiver signals;
processing the digital data samples to determine a relative speed of at least one target vehicle in a front zone relative to the patrol vehicle or the rear zone relative to the patrol vehicle; and
converting the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

17. The computer-implemented method of claim 16, further comprising:

performing a time domain to frequency domain conversion on the digital data samples creating a plurality of frequency bins, each frequency bin associated with a bin number, having a relative magnitude value, and corresponding to a speed of a vehicle,
identifying a range of frequency bin numbers that correspond to the speed of the patrol vehicle and form a patrol vehicle speed window,
determining at least one group of successive frequency bin numbers outside of the patrol vehicle speed window whose relative magnitude is greater than a spike threshold value, and
converting one frequency bin number in each group to the relative speed of one target vehicle.

18. The computer-implemented method of claim 16, further comprising determining whether the patrol vehicle is moving or stationary and converting the relative speed of the target vehicle to the absolute speed using the speed of the patrol vehicle only when the patrol vehicle is moving.

19. The computer-implemented method of claim 16, wherein the patrol vehicle speed is received in a stream of messages and the computer-implemented method further comprises determining that the patrol vehicle is moving when the patrol vehicle

speed is greater than a first threshold value for a predetermined number of successive messages.

20. The computer-implemented method of claim 16, wherein the patrol vehicle speed is received in a stream of messages and the computer-implemented method further comprises determining that the patrol vehicle is stationary when the patrol vehicle speed is less than a second threshold value for a predetermined number of successive messages.

ABSTRACT

A traffic radar system comprises a first radar transceiver, a second radar transceiver, a speed determining element, and a processing element. The first radar transceiver transmits and receives radar beams and generates a first electronic signal corresponding to the received radar beam. The second radar transceiver transmits and receives radar beams and generates a second electronic signal corresponding to the received radar beam. The speed determining element determines and outputs a speed of the patrol vehicle. The processing element is configured to receive a plurality of digital data samples derived from the first or second electronic signals, receive the speed of the patrol vehicle, process the digital data samples to determine a relative speed of at least one target vehicle in the front zone or the rear zone, and convert the relative speed of the target vehicle to an absolute speed using the speed of the patrol vehicle.

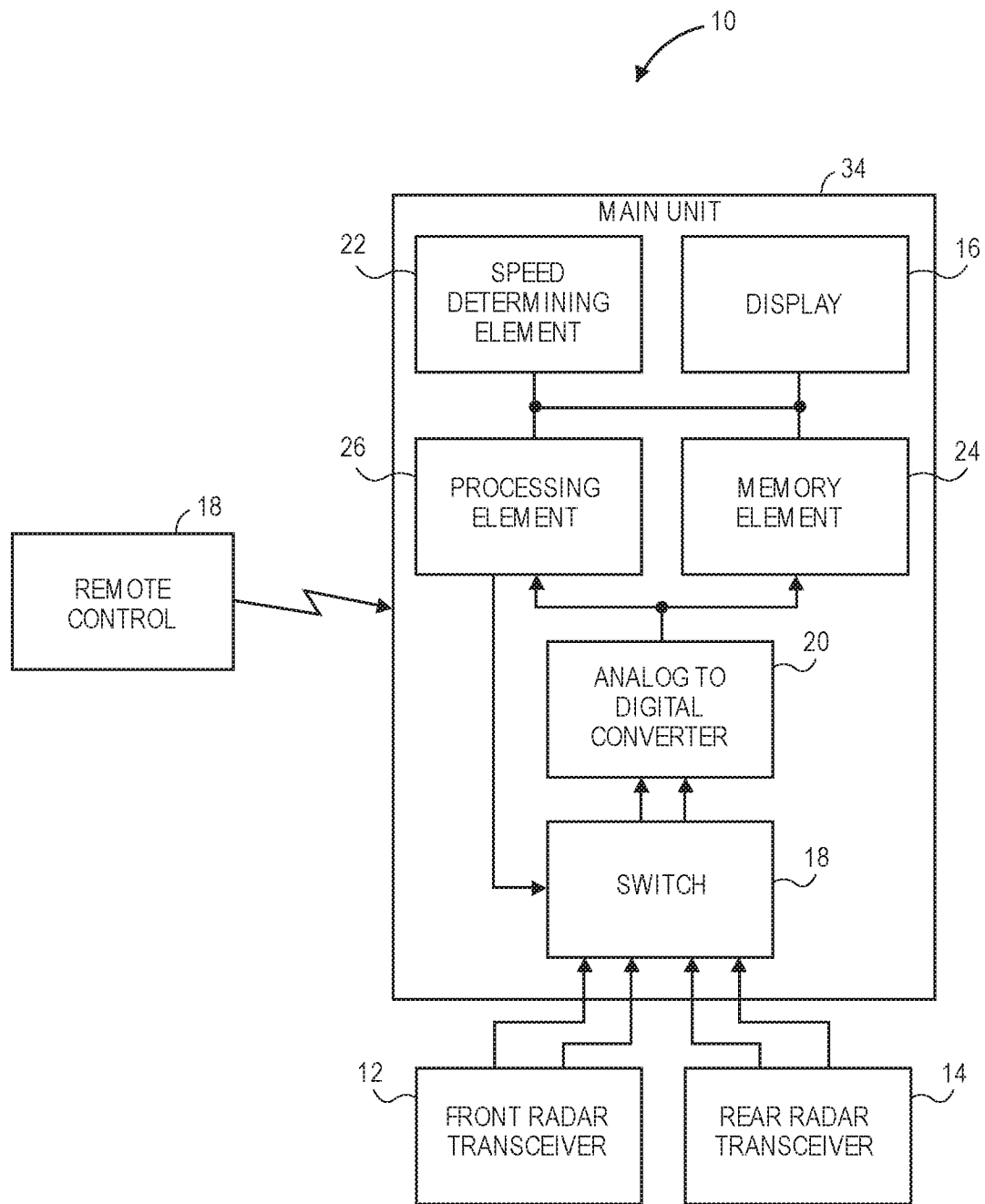


FIG. 1

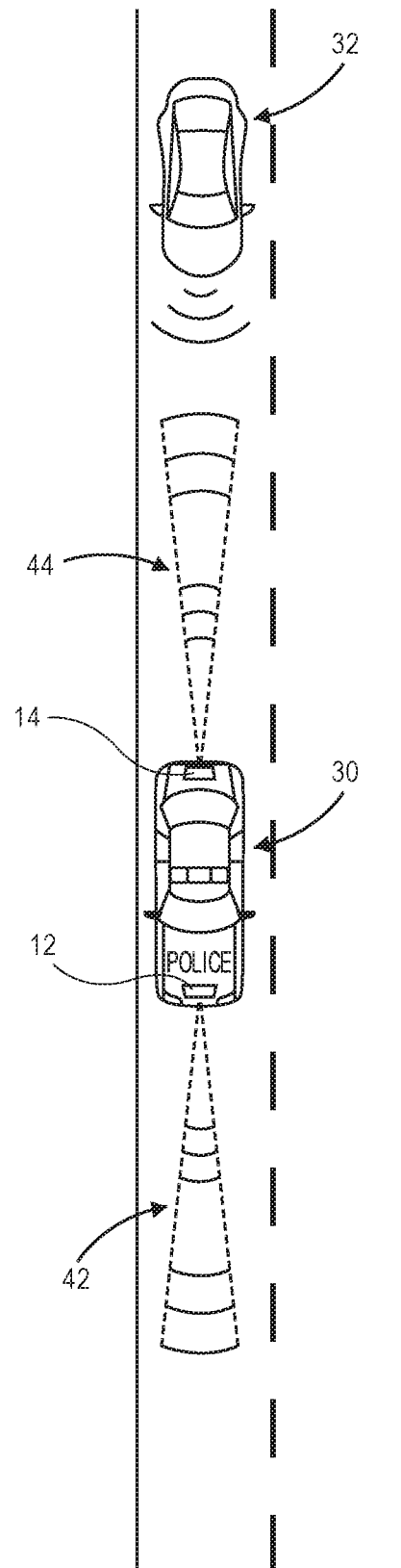


FIG. 2

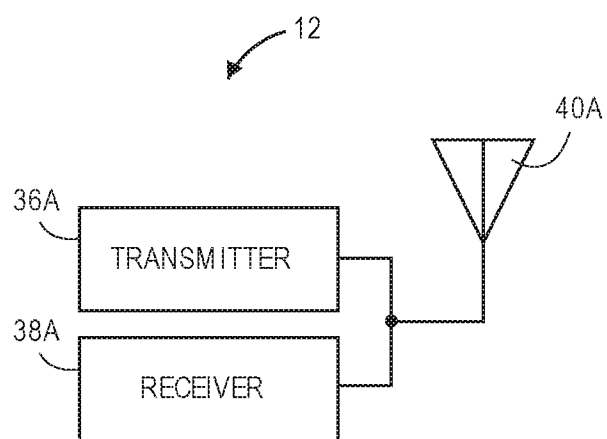


FIG. 3

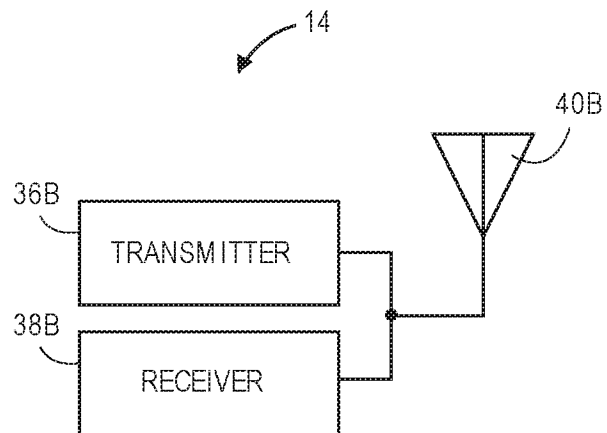


FIG. 4

SPEED DATA MESSAGE

```
$GPRMC,082653.100,A,2446.4768,N,12100.0344,E,0.00,128.42,270705,,,A*67 <CR><LF>
```

FIG. 5

SPEED DATA MESSAGE FORMAT

FIELD	EXAMPLE	COMMENTS
PREAMBLE	\$	START OF SENTENCE
TALKER ID	GP	NAVIGATION SYSTEM GP=GPS GL=GLONASS GN=GLOBAL NAVIGATION BD=BEIDOU (COMPASS)
SENTENCE ID	RMC	RECOMMENDED MINIMUM SPECIFIC GNSS DATA
UTC TIME	082653.100	HHMMSS.SSS (HOURS, MINUTES, SECONDS)
DATA VALID STATUS	A	A = DATA VALID V = NAVIGATION RECEIVER WARNING (DATA INVALID)
LATITUDE N/S INDICATOR	2446.4768 N	DDMM.MMMM (DEGREES AND MINUTES) N = NORTH, S = SOUTH
LONGITUDE EW INDICATOR	12100.0344 E	DDDMM.MMMM (DEGREES AND MINUTES) E = EAST, W = WEST
SPEED OVER GROUND	0.00	KNOTS
COURSE OVER GROUND	128.42	DEGREES TRUE
UTC DATE	270705	DDMMYY (DAY, MONTH, YEAR)
MAGNETIC VARIATION MAGNETIC VARIATION		DEGREES MAGNETIC E = EAST, W = WEST
MODE INDICATOR	A	A = AUTONOMOUS MODE D = DIFFERENTIAL MODE E = ESTIMATED (DEAD RECKONING) MODE M = MANUAL INPUT MODE S = SIMULATOR MODE N = DATA NOT VALID
END OF DATA FIELDS	*	ASTERISK DELIMITER
CHECKSUM	67	TWO CHARACTER HEXADECIMAL VALUE
TERMINATOR	<CR><LF>	END OF SENTENCE SEQUENCE

FIG. 6

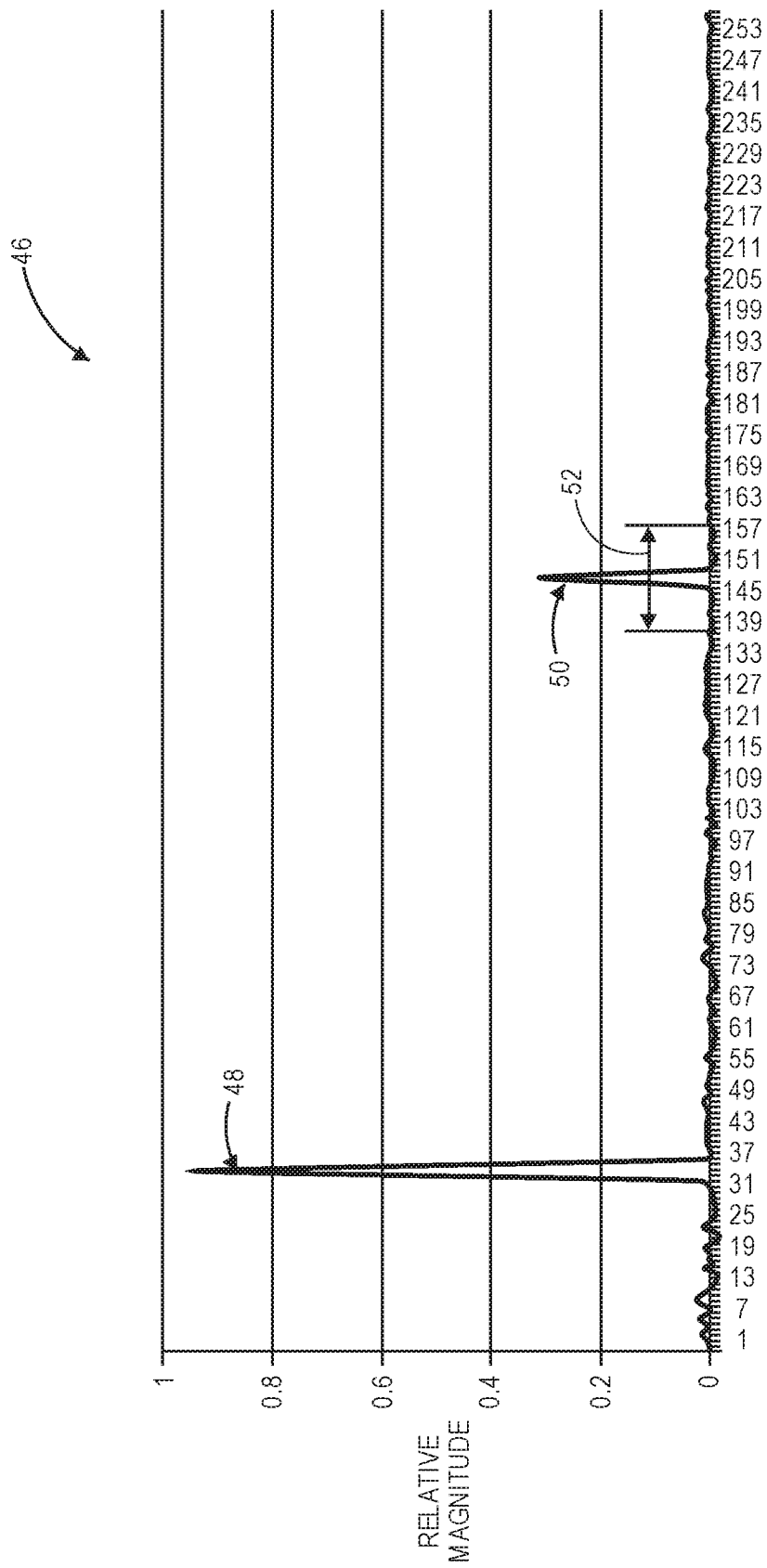


FIG. 7

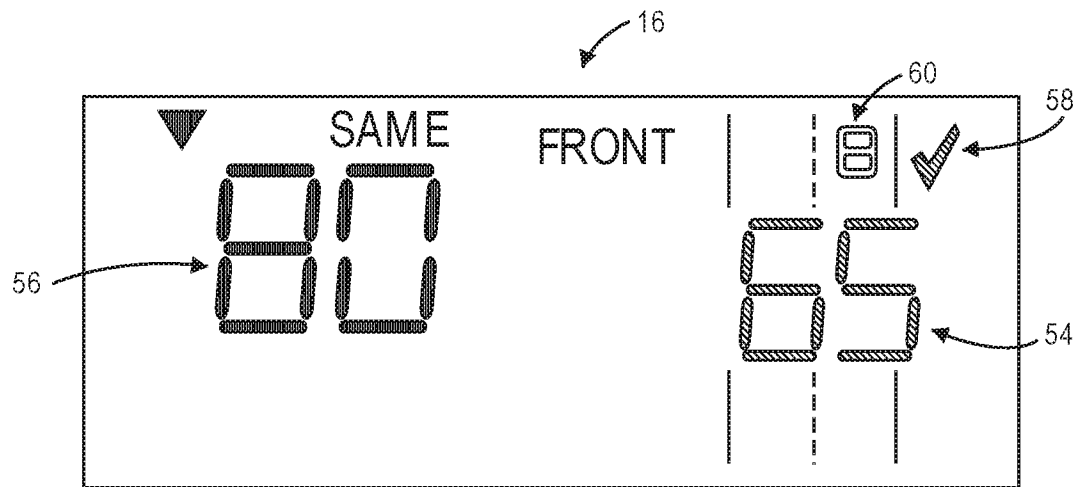


FIG. 8

DATA PACKET FORMAT

RECORD NUMBER:	00101
RECORD TYPE:	LOCKED SPEEDS EVENT
UTC TIME:	09:14:32
UTC DATE:	27-09-2017
LOCATION:	37.6792 N, 95.4572 W
PATROL COURSE:	273 DEGREES
PATROL SPEED:	65 MPH
TARGET SPEED:	80 MPH
OPERATING MODE:	MOVING SAME DIRECTION

FIG. 9

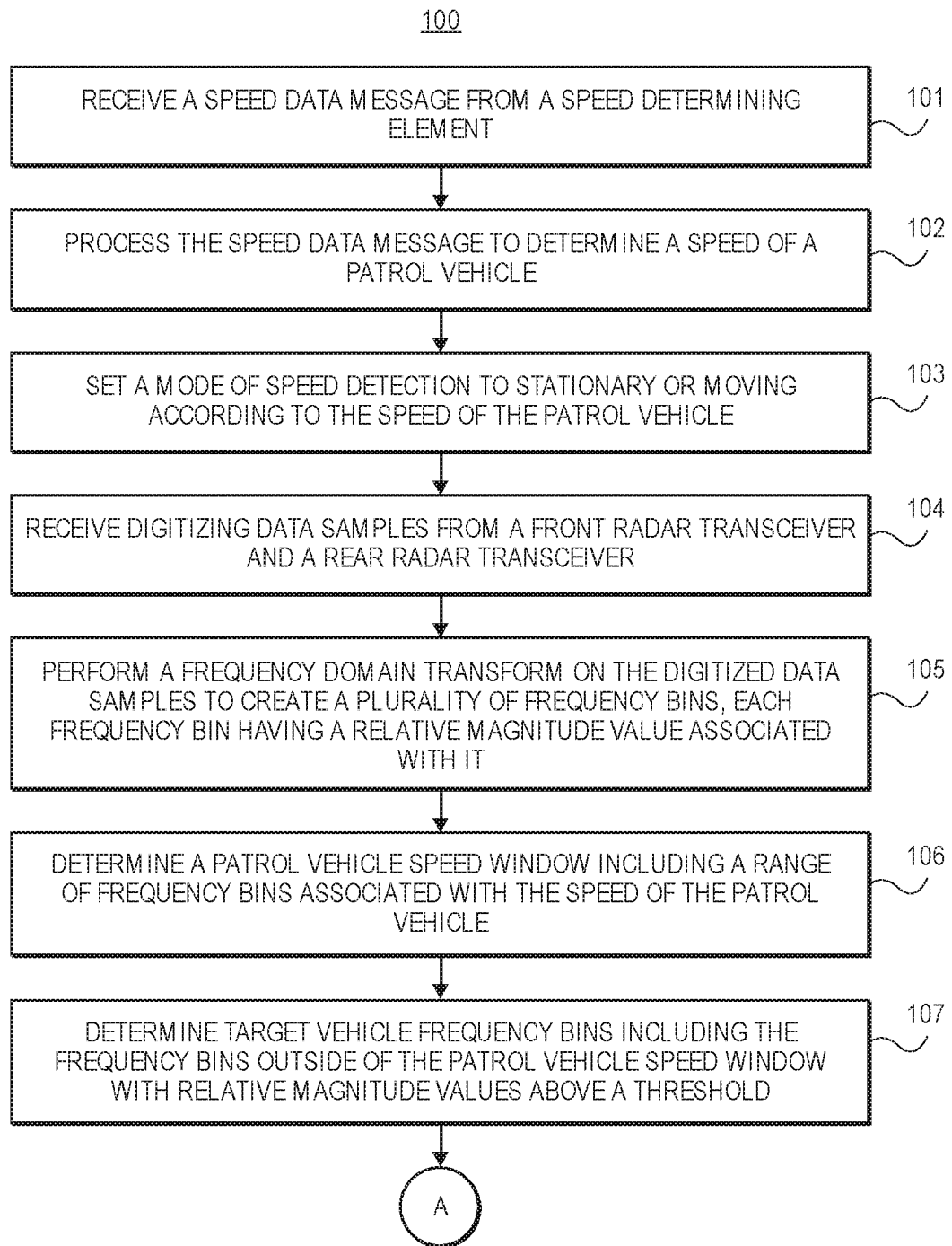


FIG. 10A

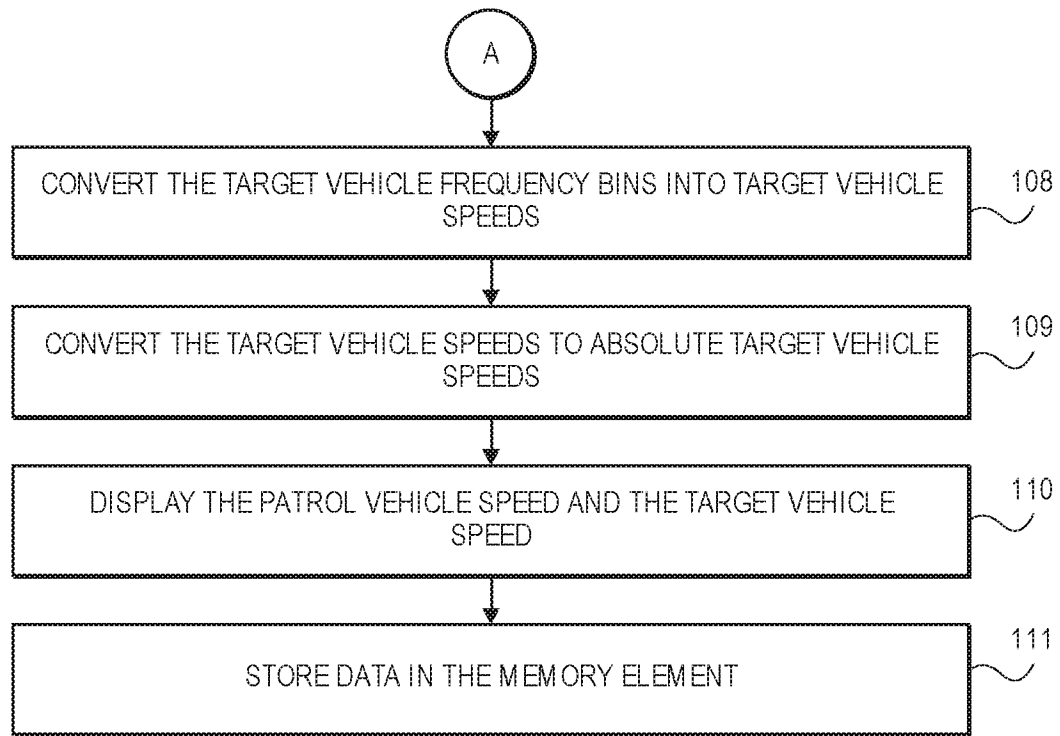


FIG. 10B

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTION
---------------------------	---

As the below named inventor, I hereby declare that:

This declaration is directed to:



The attached application, or



United States application or PCT international application number _____
filed on _____

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Maurice Shelton

Date (Optional): 9-20-18

Signature: Maurice Shelton

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. 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 1.11 and 1.14. This collection is estimated to take 1 minute 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.

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.

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: SHELTON, Maurice

Application No./Patent No.: _____ Filed/Issue Date: _____

Titled: TRAFFIC RADAR SYSTEM WITH PATROL VEHICLE SPEED DETECTIONKustom Signals, Inc., a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:
1. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.
2. From: _____ To: _____
- The document was recorded in the United States Patent and Trademark Office at
- Reel _____, Frame _____, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). 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 1.11 and 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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Thomas B. Luebbering/

2018-09-21

Signature

Date

Thomas B. Luebbering

37874

Printed or Typed Name

Title or Registration 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.

ASSIGNMENT

WHEREAS, I, Maurice Shelton, of Buffalo, KS, have invented certain new and useful improvements in

ASSISTED PATROL SPEED SEARCH FOR DSP TRAFFIC RADAR

for which I am about to make application for Letters Patent of the United States; and

WHEREAS, Kustom Signals, Inc., a corporation duly organized under the laws of the State of Kansas, and having its principal place of business at 9652 Loiret Boulevard, Lenexa, KS 66217, is desirous of acquiring an interest in, to, and under said invention, said Application and any and all Letters Patent which may be granted for or upon said invention in the United States of America and all countries foreign thereto.

NOW, THEREFORE, to all whom it may concern be it known that for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, I, Maurice Shelton, have sold, assigned, and transferred, and by these presents do sell, assign, and transfer unto said Kustom Signals, Inc., the full and exclusive right, title, and interest, throughout the world, in, to, and under the following:

- (a) said invention as fully set forth and described in said application;
- (b) said application, including the right to claim priority to said application;
- (c) any and all patent applications which claim the priority (directly or indirectly) of said application and have been, or may be, filed in the United States or any country foreign thereto, or via any international treaty or convention, together with all the rights to file and make any priority claims in connection with said later-filed applications;
- (d) any and all inventions disclosed or claimed in such later-filed applications;
- (e) any and all refilings, divisionals, and continuations of said later-filed applications;
- (f) any and all patents which may issue from said later-filed applications, refiling, divisionals and continuations; and
- (g) any and all reissues and extensions of, and additions to, any patents assigned herein.

ALL of the above shall be held and enjoyed by said Kustom Signals, Inc. for its own use and behoof, and for its successors, legal representatives, and assigns, to the full end of the term for

which said Letters Patent may be granted, and I do hereby authorize and request the Commissioner of Patents and Trademarks to issue said Letters Patent in accordance with this Assignment.

Assignor(s) further agree to execute all paperwork and provide any other requested, non-monetary assistance in procuring, perfecting, enforcing, and/or defending Assignee's rights in the rights assigned herein.

Executed this 9 day of October, 2017.

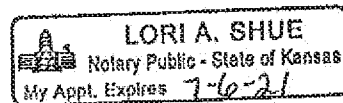
Maurice Shelton
Maurice Shelton

STATE OF Kansas)
) SS.
COUNTY OF Neosho)

On this 9th day of October, 2017, before me personally appeared, Maurice Shelton, to me known to be the person described in and who executed the foregoing instrument, and duly acknowledged to me that executed the same for the uses and purposes therein set forth.

Lori A. Shue
Notary Public

My Commission Expires: July 6, 2021



Name of Company hereby declares it accepts the rights and property hereby assigned and transferred to it.

Kustom Signals, Inc.
By Frederick S. Perry
Print: FREDERICK S. PERRY
Title: PRESIDENT