



NOTICE OF ALLOWANCE AND FEE(S) DUE

120226 7590 06/21/2016
Patterson & Sheridan - The Boeing Company
c/o Patterson & Sheridan, LLP
24 GREENWAY PLAZA, SUITE 1600
Houston, TX 77046

EXAMINER

MCGUE, FRANK J

ART UNIT PAPER NUMBER

3646

DATE MAILED: 06/21/2016

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

13/875,749 05/02/2013 Timothy Allen Murphy 12-1366 (071631) 6872

TITLE OF INVENTION: DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

nonprovisional UNDISCOUNTED \$960 \$0 \$0 \$960 09/21/2016

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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 or Fax (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.

120226 7590 06/21/2016
Patterson & Sheridan - The Boeing Company
 c/o Patterson & Sheridan, LLP
 24 GREENWAY PLAZA, SUITE 1600
 Houston, TX 77046

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/875,749	05/02/2013	Timothy Allen Murphy	12-1366 (071631)	6872

TITLE OF INVENTION: DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	09/21/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
MCGUE, FRANK J	3646	342-417000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). <input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. <input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 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, _____ 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 has been filed for recordation as set forth in 37 CFR 3.11. 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. The following fee(s) are submitted: <input type="checkbox"/> Issue Fee <input type="checkbox"/> Publication Fee (No small entity discount permitted) <input type="checkbox"/> Advance Order - # of Copies _____	4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above) <input type="checkbox"/> A check is enclosed. <input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached. <input type="checkbox"/> The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).
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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 _____ Date _____

Typed or printed name _____ Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

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

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/875,749 05/02/2013 Timothy Allen Murphy 12-1366 (071631) 6872

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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 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, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 13/875,749	Applicant(s) MURPHY ET AL.	
	Examiner FRANK J. MCGUE	Art Unit 3646	AIA (First Inventor to File) 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 24 May 2016.
 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 1-15. 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. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 2. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 6. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 7. <input type="checkbox"/> Other _____. |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. | |

/FRANK J MCGUE/
Primary Examiner, Art Unit 3646

Art Unit: 3646

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.

Notice of Pre-AIA or AIA Status

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

Claim Status

Claims 1-15 are currently pending. Claims 16-20 are withdrawn.

Examiner's Amendment

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

The application has been amended as follows:

Cancel claims 16-20.

The above amendment was authorized by Carleton Clauss (R/N 27713) in a telephone conversation on 16 June 2016.

Art Unit: 3646

Allowable Subject Matter

Claims 1-15 are allowed.

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

Applicant's amendments and arguments of 24 May 2016 are persuasive. The rejections of claims are hereby withdrawn.

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."

Contact Information


Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRANK MCGUE whose telephone number is (571)270-5987. The examiner can normally be reached on Monday - Thursday, 7:00am to 3:30pm, Friday - Saturday, 7:00am to 11:00am.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. 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.

Art Unit: 3646

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


/FRANK J MCGUE/
Primary Examiner, Art Unit 3646

Issue Classification 	Application/Control No. 13875749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.
	Examiner FRANK J MCGUE	Art Unit 3646

CPC						
Symbol					Type	Version
G01S		3		043	F	2013-01-01
G01S		3		46	I	2013-01-01
G01S		5		0072	I	2013-01-01
G01S		5		021	I	2013-01-01
G01S		5		08	I	2013-01-01


CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		Total Claims Allowed:	
(Assistant Examiner) (Date)		15	
/FRANK J MCGUE/ Primary Examiner. Art Unit 3646	06/16/2016	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification 	Application/Control No. 13875749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.
	Examiner FRANK J MCGUE	Art Unit 3646


US ORIGINAL CLASSIFICATION						INTERNATIONAL CLASSIFICATION											
CLASS			SUBCLASS			CLAIMED				NON-CLAIMED							
342			417			G	0	1	S	5 / 02 (2010.01.01)							
CROSS REFERENCE(S)																	
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)																

NONE		Total Claims Allowed:	
		15	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/FRANK J MCGUE/ Primary Examiner. Art Unit 3646	06/16/2016	1	1
(Primary Examiner)	(Date)		

Issue Classification 	Application/Control No. 13875749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.
	Examiner FRANK J MCGUE	Art Unit 3646

<input checked="" type="checkbox"/> Claims renumbered in the same order as presented by applicant <input type="checkbox"/> CPA <input type="checkbox"/> T.D. <input type="checkbox"/> R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17												
	2		18												
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	11														
	12														
	13														
	14														
	15														
	16														

NONE		Total Claims Allowed:	
		15	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/FRANK J MCGUE/ Primary Examiner. Art Unit 3646	06/16/2016	1	1
(Primary Examiner)	(Date)		

Search Notes 	Application/Control No. 13875749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.
	Examiner FRANK J MCGUE	Art Unit 3646

CPC- SEARCHED		
Symbol	Date	Examiner
G01S3/043, G01S3/46, G01S5/0072, G01S5/021, G01S5/08	14 March 2016	FJM

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
342	417	14 March 2016	FJM

SEARCH NOTES		
Search Notes	Date	Examiner
inventor name search completed, class searching, text searching	14 March 2016	FJM
updated class searching	16 June 2016	FJM

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	interference search completed	16 June 2016	FJM

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BIB DATA SHEET

CONFIRMATION NO. 6872

SERIAL NUMBER 13/875,749	FILING or 371(c) DATE 05/02/2013 RULE	CLASS 342	GROUP ART UNIT 3646	ATTORNEY DOCKET NO. 12-1366 (071631)	
APPLICANTS The Boeing Company, Chicago, IL INVENTORS Timothy Allen Murphy, Everett, WA; William Matthew Harris, Seattle, WA; ** CONTINUING DATA ***** ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **					
Foreign Priority claimed <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 35 USC 119(a-d) conditions met <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Verified and Acknowledged <u>/FRANK J MCGUE/</u> Examiner's Signature	<input type="checkbox"/> Met after Allowance Initials _____	STATE OR COUNTRY WA	SHEETS DRAWINGS 8	TOTAL CLAIMS 20	INDEPENDENT CLAIMS 4
ADDRESS Patterson & Sheridan - The Boeing Company c/o Patterson & Sheridan, LLP 24 GREENWAY PLAZA, SUITE 1600 Houston, TX 77046 UNITED STATES					
TITLE Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation					
FILING FEE RECEIVED 2020	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<input type="checkbox"/> All Fees <input type="checkbox"/> 1.16 Fees (Filing) <input type="checkbox"/> 1.17 Fees (Processing Ext. of time) <input type="checkbox"/> 1.18 Fees (Issue) <input type="checkbox"/> Other _____ <input type="checkbox"/> Credit		

EAST Search History

EAST Search History (I nterference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L12	30123	aircraft.clm.	USPAT	OR	ON	2016/06/16 13:28
L13	1991	l12 and receiver.clm.	USPAT	OR	ON	2016/06/16 13:28
L14	188	l13 and automatic.clm.	USPAT	OR	ON	2016/06/16 13:28
L15	49	l14 and dependent.clm.	USPAT	OR	ON	2016/06/16 13:28
L16	43	l15 and surveillance.clm.	USPAT	OR	ON	2016/06/16 13:29
L17	40	l16 and broadcast.clm.	USPAT	OR	ON	2016/06/16 13:29
L18	1	l17 and verification.clm.	USPAT	OR	ON	2016/06/16 13:29
L19	0	l18 and target.clm.	USPAT	OR	ON	2016/06/16 13:29
L20	696843	input.clm.	USPAT	OR	ON	2016/06/16 13:29
L21	294244	l20 and receiving.clm.	USPAT	OR	ON	2016/06/16 13:29
L22	27	l21 and ((ADS adj B)"ADS-B").clm.	USPAT	OR	ON	2016/06/16 13:30
L23	15	l22 and flight.clm.	USPAT	OR	ON	2016/06/16 13:30
L24	2	l23 and tracking.clm.	USPAT	OR	ON	2016/06/16 13:30
L25	2	l24 and information.clm.	USPAT	OR	ON	2016/06/16 13:30
L26	0	l25 and indicated.clm.	USPAT	OR	ON	2016/06/16 13:30
L27	24423	positional.clm.	USPAT	OR	ON	2016/06/16 13:31
L28	15285	l27 and second.clm.	USPAT	OR	ON	2016/06/16 13:31
L29	84	l28 and heading.clm.	USPAT	OR	ON	2016/06/16 13:31
L30	10	l29 and indicating.clm.	USPAT	OR	ON	2016/06/16 13:31
L31	1	l30 and orientation.clm.	USPAT	OR	ON	2016/06/16 13:31
L32	0	l31 and multi.clm.	USPAT	OR	ON	2016/06/16 13:31
L33	857794	element.clm.	USPAT	OR	ON	2016/06/16 13:32

L34	61363	33 and array.clm.	USPAT	OR	ON	2016/06/16 13:32
L35	5546	34 and antenna.clm.	USPAT	OR	ON	2016/06/16 13:32
L36	298	35 and attached.clm.	USPAT	OR	ON	2016/06/16 13:32
L37	38	36 and processing.clm.	USPAT	OR	ON	2016/06/16 13:32
L38	9	37 and module.clm.	USPAT	OR	ON	2016/06/16 13:32
L39	1	38 and bearing.clm.	USPAT	OR	ON	2016/06/16 13:33
L40	1	39 and derived.clm.	USPAT	OR	ON	2016/06/16 13:33
L41	1	40 and angle.clm.	USPAT	OR	ON	2016/06/16 13:33
L42	0	41 and arrival.clm.	USPAT	OR	ON	2016/06/16 13:33

6/ 16/ 2016 1:33:57 PM

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	953	342/417	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L2	12	G01S3/043	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L3	1026	G01S3/46	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L4	71	G01S5/0072	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L5	123	G01S5/021	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L6	272	G01S5/08	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L7	2443	L1 L2 L3 L4 L5 L6	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L8	2443	L7	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:25
L9	763377	@pd>="20160314"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:26
L10	149043	"I0" an dl8	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/06/16 13:26

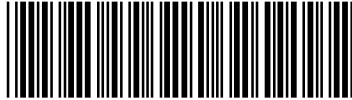
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S2	934	342/417	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:06
S3	7	G01S3/043	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:06
S4	1002	G01S3/46	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S5	51	G01S5/0072	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S6	94	G01S5/021	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S7	261	G01S5/08	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S8	2337	S2 S3 S4 S5 S6 S7	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S9	1618	(automatic adj dependent adj surveillance adj broadcast) ADSB "ADS- b"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:08
S10	26	S8 and S9	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:08

S11	2664721	phase	US-PGPUB; USPAT	OR	ON	2016/02/04 09:00
S12	938	342/417	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S13	8	G01S3/043	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S14	1007	G01S3/46	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S15	57	G01S5/0072	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S16	102	G01S5/021	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S17	269	G01S5/08	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S18	2368	S12 S13 S14 S15 S16 S17	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S19	2368	S18	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
S20	210348	@pd>="20160204"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:06
S21	28	S18 and S20	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:06
S22	63	("8130135" "8169357" "7880667" "7961136" "8004452" "20070109190" "6681158" "6952631" "7383124" "7414567" "6473003" "7342514" "7730307" "8072382" "20110163908" "7956795" "8063816" "7570214"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:18

		"20120223811" "7423590" "7495612" "7761196" "8102301" "20120299763").PN.				
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<i>Index of Claims</i> 	Application/Control No. 13875749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.
	Examiner FRANK J MCGUE	Art Unit 3646

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	03/14/2016	06/16/2016						
	1	✓	=						
	2	✓	=						
	3	✓	=						
	4	✓	=						
	5	✓	=						
	6	✓	=						
	7	✓	=						
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	16	N	-						
	17	N	-						
	18	N	-						
	19	N	-						
	20	N	-						



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/875,749 05/02/2013 Timothy Allen Murphy 12-1366 (071631) 6872

120226 7590 05/27/2016
Patterson & Sheridan - The Boeing Company
c/o Patterson & Sheridan, LLP
24 GREENWAY PLAZA, SUITE 1600
Houston, TX 77046

EXAMINER

MCGUE, FRANK J

ART UNIT PAPER NUMBER

3646

NOTIFICATION DATE DELIVERY MODE

05/27/2016

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):

- PAIR_eofficeaction@pattersonsheridan.com
PatentAdmin@boeing.com
PSDocketing@pattersonsheridan.com

Applicant-Initiated Interview Summary	Application No. 13/875,749	Applicant(s) MURPHY ET AL.	
	Examiner FRANK J. MCGUE	Art Unit 3646	

All participants (applicant, applicant's representative, PTO personnel):

- (1) FRANK J. MCGUE. (3) _____.
- (2) Carleton Claus, R/N 66230. (4) _____.

Date of Interview: 24 May 2016.

Type: Telephonic Video Conference
 Personal [copy given to: applicant applicant's representative]

Exhibit shown or demonstration conducted: Yes No.
If Yes, brief description: _____.

Issues Discussed 101 112 102 103 Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1.

Identification of prior art discussed: Andressen.

Substance of Interview

(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

The parties agreed that applicant's proposed filing would likely overcome the Anderssen reference as that document does not disclosed calculating an expected bearing, subject, of course, to further search and consideration. There was some discussion that applicant's claim language might be broader than necessary in use of the term "bearing" instead of simply "angle of arrival".

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.

Attachment

/FRANK J MCGUE/
Primary Examiner, Art Unit 3646

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Murphy et al.	§ § § § § §	Filed: May 2, 2013
Serial No.: 13/875,749		Group Art Unit: 3646
Confirmation No.: 6872		Examiner: Frank Mcgue

For: **DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL
MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION**

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

CERTIFICATE OF MAILING OR TRANSMISSION	
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and Trademark Office to fax number 571-273-8300 to the attention of Examiner Frank Mcgue, or electronically transmitted via EFS-Web, on the date shown below:	
May 24, 2016	/ Jennifer A. WEAVER/
Date	Jennifer A. Weaver

Dear Sir:

RESPONSE TO OFFICE ACTION DATED MARCH 21, 2016

In response to the Office Action dated March 21, 2016, having a shortened statutory period for response set to expire on June 21, 2016, please enter this response and reconsider the claims pending in the application for reasons discussed below. While no fees are believed due, the Commissioner is hereby authorized to charge counsel's Deposit Account No. 20-0782 / 12-1366 (071631)/ GGM for any fees, including extension of time fees or excess claim fees, required to make this response timely and acceptable to the Office.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper. Remarks/Arguments begin on page 11 of this paper.

IN THE CLAIMS:

Please amend the claims as follows:

1. (Previously Presented) An aircraft receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification of a target aircraft, comprising:

a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft;

a second input for receiving positional information and heading information indicating the location and orientation of a multi-element array antenna configured to be attached to the receiver;

a processing module operative to:

generate a measured bearing derived from angle of arrival data, and

generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation;

a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

2. (Original) The aircraft receiver according to claim 1, wherein the processing module being further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional information,

wherein computing the vector being based on receiving the positional information from a Global Navigation Surveillance System (GNSS) indicating the location of the multi-element array antenna.

3. (Original) The aircraft receiver according to claim 2, wherein the processing module being further operative translate the vector from an earth reference frame to an airplane reference frame based the heading information including pitch, roll and heading data generated from an Inertial Reference Unit (IRU) indicating the orientation of the multi-element array antenna.

4. (Original) The aircraft receiver according to claim 1, wherein the processing module being further operative generate the measured bearing based on measuring a relative phase of a carrier signal identified in the first input.

5. (Original) The aircraft receiver according to claim 1, further comprising an Analog-to-Digital (A/D) converter for processing signals received on the first input,

wherein the A/D processing transmits a synchronizing signal to a commutating multiple-element array antenna that feeds the signals to the first input.

6. (Previously Presented) A receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification, comprising:

a processing module receiving an ADS-B signal from a target aircraft including indicated positional data, and operative to:

generate a measured bearing derived from detection of an angle of arrival of the ADS-B signal, and

generate an expected bearing of the target aircraft derived from the indicated positional data of the ADS-B signal, and positional and heading information of a location and orientation of a multi-element array antenna configured to be attached to the receiver;

a comparator for comparing the expected bearing to the measured bearing and for verifying the ADS-B indicated positional data of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B indicated positional data of the target aircraft.

7. (Original) The receiver according to claim 6, wherein the processing module being further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional data,

wherein computing the vector being based on receiving the positional information from a Global Navigation Satellite System (GNSS) indicating the location of the multi-element array antenna.

8. (Original) The receiver according to claim 7, wherein the processing module being further operative to translate the vector from an earth reference frame to an airplane reference frame based the heading information including pitch, roll and heading data generated from an Inertial Reference Unit (IRU) indicating the orientation of the multi-element array antenna.

9. (Original) The receiver according to claim 6, wherein the processing module being further operative to generate the measured bearing based on measuring a relative phase of a carrier signal of the ADS-B signal from the target aircraft.

10. (Original) The receiver according to claim 6, further comprising an Analog-to-Digital (A/D) converter processing ADS-B signals received from the target aircraft,

wherein the A/D processing is synchronized to a commutating multiple-element array antenna feeding the ADS-B signals to the receiver.

11. (Previously Presented) A system for automatic dependent surveillance broadcast (ADS-B) verification, comprising:

an antenna array assembly having a multiple-element antenna array for receiving ADS-B signals from a target aircraft, the ADS-B signals including indicated positional data; and

a receiver configured to receive the ADS-B signals from the antenna array assembly and to measure an angle of arrival of the ADS-B signals relative to the orientation of the antenna array assembly, wherein the receiver comprises:

a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft;

a second input for receiving positional information and heading information indicating the location and orientation of the receiver;

a processing module operative to:

generate a measured bearing derived from angle of arrival data,

and

generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation; and

a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

12. (Original) The system according to claim 11, where the antenna array assembly further comprises a commutating solid state switch that cycles between each antenna element of a multi-element array antenna.

13. (Original) The system according to claim 12, where the receiver further comprises an analog-to-digital (A/D) converter that receives the ADS-B signals and controls the cycling of the commutating solid state switch with a synchronization signal.

14. (Currently Amended) The system according to claim 11, wherein the processing module being further operative to decode the indicated positional data from the target transmitter from one discrete digital data stream for a single antenna element of the ~~[[multi]] multiple-element antenna array antenna~~ via an ADS-B signal demodulation process; and

determine an expected AOA of the target transmitter derived from the decoded indicated positional data from the target transmitter, and positional information defining a location of the receiver and heading information defining an orientation of the antenna array assembly.

15. (Original) The system according to claim 14, wherein the processing module being further operative to compare the expected AOA to the measured AOA to verify the indicated positional data from the target transmitter in the received ADS-B signal; and

provide an indication of authenticity based on verifying the indicated positional data from the target transmitter.

16. (Withdrawn) A method of measuring an Angle of Arrival (AOA), comprising:

cycling a commutating solid state switch between each antenna element of a multi-element array antenna based on a synchronization signal received from a receiver system;

receiving at least one signal at the multi-element array antenna so that a time multiplexed RF signal is received at an output of the commutating solid state switch;

converting the time multiplexed RF signal at an analog-to-digital (A/D) converter based on the synchronization signal into a plurality of antenna element specific digital samples for each discrete signal;

de-multiplexing the plurality of antenna element specific digital samples into discrete digital data streams for each antenna element of the multi-element array antenna; and

determining a measured AOA of the at least one signal based on measuring a relative phase of a carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna.

17. (Withdrawn) The method according to claim 16, where the signal comprises an ADS-B signal including indicated positional data from a target transmitter.

18. (Withdrawn) The method according to claim 17, further comprising:

decoding the indicated positional data from the target transmitter from one discrete digital data stream for a single antenna element of the multi-element array antenna via an ADS-B signal demodulation process;

determining an expected AOA of the target transmitter derived from the decoded indicated positional data from the target transmitter, and positional information defining a location of the receiver system and heading information defining an orientation of an antenna subsystem of the receiver system;

comparing the expected AOA to the measured AOA to verify the indicated positional data from the target transmitter in the received ADS-B signal; and

providing an indication of authenticity based on verifying the indicated positional data from the target transmitter.

19. (Withdrawn) The method according to claim 16, where the at least one signal comprises a plurality of signals from at least two emitters of signals of opportunity.

20. (Withdrawn) The method according to claim 19, further comprising:

retrieving an identity for each respective emitter from a database;

determine a location for each emitter based on the identity for each respective emitter from the database;

determining AOAs for each signal from the respective emitters based on measuring the relative phase of the carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna; and

compute an independent position fix of the antenna subsystem of the receiver system based on the AOAs locations and each respective emitter location.

REMARKS

This is intended as a full and complete response to the Office Action dated March 21, 2016, having a shortened statutory period for response set to expire on June 21, 2016. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-20 are pending in the application. Claims 1-15 remain pending following entry of this response. Claims 16-20 are withdrawn. Claim 14 has been amended. Applicant submits that the amendments do not introduce new matter.

Further, Applicant is not conceding in this application that those amended claims are not patentable over the art cited by the Examiner, as the present claim amendments are only for facilitating expeditious prosecution of the claimed subject matter. Applicant respectfully reserves the right to pursue these pre-amended claims and other claims in one or more continuations and/or divisional patent applications.

Statement of Substance of Interview

On My 24, 2016, a telephonic interview was held between Carleton Clauss (attorney – Reg. No. 66230) and Examiner Frank McGue. The parties discussed the cited references including *Andersson*. The independent claims were discussed.

During the interview, Applicant argued that *Andersson* does not teach generating measured and estimated bearings. Examiner McGue agreed that *Andersson* did not appear to teach each element of the independent claims but stated that further search and consideration are required.

Claim Rejections - 35 U.S.C. § 112

Claim 14 stands 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 pre-AIA the applicant regards as the invention.

Applicant has amended “multi-element array antenna” to “multiple-element antenna array” which has proper antecedent basis in claim 11, and thus, requests that this rejection be withdrawn.

Claim Rejections - 35 U.S.C. § 102

Claims 1-3, 6-8 and 11 stand rejected under 35 U.S.C. § 102(a)(2) as being anticipated by *Andersson et al.*, U.S. Publication No. 2011/0163908 (hereinafter *Andersson*).

Applicant respectfully traverses this rejection.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

In this case, *Andersson* does not disclose “each and every element as set forth in the claim”. For example, *Andersson* does not disclose, as is recited in claim 1:

- generat[ing] a measured bearing derived from angle of arrival data, and
- generat[ing] an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation.

The Office asserts that these two claim elements are taught in paragraphs [0018-19]. *Office Action*, p. 4. These paragraphs state in their entirety:

estimating the distance between the receiving unit and the radio source based on the time of flight for a signal travelling there between at known speed;

calculating an estimated position of the radio source based on the estimated bearing and the estimated distance.

To provide additional context, *Andersson* teaches:

a radio direction finding antenna arrangement of a receiving unit receives a signal carrying positional data indicating an alleged position of a vehicle transmitted from a radio source. The bearing from the receiving unit to the radio source is estimated utilizing the radio direction finding antenna arrangement and the received signal. The distance between the receiving unit and the radio source is estimated based on the time of flight for a signal travelling there between at known speed. An estimated position of the radio source is calculated based on the estimated bearing and the estimated distance. *Abstract.*

Andersson further explains that estimating the bearing from the receiving unit to the radio source is “performed by receiving the signal with a directional antenna connected to a transceiver circuitry which is adapted to determine the bearing to the radio source based on the output from the directional antenna.” ¶ [0024]. Once the host aircraft estimates the bearing to the emitting radio source (step S2 of Figure 3) and estimates the distance to the radio source (step S3 of Figure 3), the aircraft calculates an estimated position (P_{EST}) of the radio source using the estimated bearing and distance (step S4 of Figure 3). The estimated position is compared to the position of the radio source provided in the ADS-B transmission to determine if the ADS-B transmission is reliable. ¶ [0086].

Andersson, however, does not teach generating a measured bearing derived from angle of arrival data and generating an expected bearing derived from the indicated positional information of the target aircraft. Instead, *Andersson* generates only one estimate of the bearing for each radio source, and this estimate is generated using the same method – i.e., based on the output from the directional antenna. ¶ [0024]. Put differently, *Andersson* does not disclose using two different bearing measurements which are then compared to verify “the ADS-B flight tracking information of the target aircraft.” Instead, *Andersson* generates an estimated position of the radio source (which is derived using one estimated bearing) which is compared to the received position of the radio source provided in the ADS-B transmission to determine if the ADS-B transmission is reliable. ¶ [0086]. Because *Andersson* does not teach generating and comparing a measured bearing to an expected bearing, for at least this

reason, Applicants submit *Andersson* does not teach each and every element of claim 1.

Furthermore, *Andersson* teaches that the bearing is estimated using “means of a radio direction finding antenna arrangement capable of estimating the bearing to the emitting radio source” and by “analyzing the signal received with the radio direction finding antenna arrangement in known ways” ¶ [0082-83]. However, claim 1 recites “generating a measured bearing derived from angle of arrival data.” Angle of arrival is not even mentioned in *Andersson*. The only technical details for estimating the bearing provided in *Andersson* is that a radio direction finding antenna must be used, but this general disclosure does not specifically (or inherently) teach generating the measurement using angle of arrival data. Thus, for at least this reason, Applicants submit *Andersson* does not teach each and every element of claim 1.

Further still, even assuming *arguendo* that the mere disclosure of the radio direction finding antenna in *Andersson* does teach generating a “measured bearing derived from angle of arrival data,” claim 1 recites that the expected bearing is “derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation.” There is no teaching in *Andersson* of using the position of the radio source or the host aircraft to derive the expected bearing. Instead, *Andersson* teaches that the bearing is needed to estimate the position of the radio source. See Figure 3. Thus, for at least this reason, Applicants submit *Andersson* does not teach each and every element of claim 1.

Independent claim 6 recites:

- generat[ing] a measured bearing derived from detection of an angle of arrival of the ADS-B signal,
- generat[ing] an expected bearing of the target aircraft derived from the indicated positional data of the ADS-B signal, and positional and heading information of a location and orientation of a multi-element array antenna configured to be attached to the receiver.

As explained above, *Andersson* does not teach generating a measured bearing and an expected bearing. As such, *Andersson* does not teach each and every element of claim 6.

Independent claim 11 recites:

- generat[ing] a measured bearing derived from angle of arrival data,
- generat[ing] an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation

As explained above, *Andersson* does not teach generating a measured bearing and an expected bearing. As such, *Andersson* does not teach each and every element of claim 11.

Therefore, the claims are believed to be allowable, and allowance of the claims is respectfully requested.

Claim Rejections - 35 U.S.C. § 103

Claims 4-5, 9-10 and 12-15 stand rejected under 35 U.S.C. § 103 as being unpatentable over *Andersson* in view of *Wild et al.*, U.S. Publication No. 2012/0223811 (hereinafter *Wild*).

The rejection to claims 4-5, 9-10 and 12-15 incorporate the rejection to independent claims 1, 6, and 11, respectively. As stated above, the rejection to independent claims 1, 6, and 11 is believed to be overcome. Accordingly, the rejection to claims 4-5, 9-10 and 12-15 is also believed to be overcome. Therefore, the withdrawal of the rejection to these claims is respectfully requested.

Conclusion

PATENT

App. Ser. No.: 13/875,749
Atty. Dkt. No. 12-1366 (071631)
PS Ref. No.: 1474.071631

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully requests that the claims be allowed.

Respectfully submitted, and
S-signed pursuant to 37 CFR 1.4,

/Gero G. MCCLELLAN/

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Electronic Acknowledgement Receipt

EFS ID:	25871584
Application Number:	13875749
International Application Number:	
Confirmation Number:	6872
Title of Invention:	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation
First Named Inventor/Applicant Name:	Timothy Allen Murphy
Customer Number:	120226
Filer:	Gero G. McClellan/Jennifer Weaver
Filer Authorized By:	Gero G. McClellan
Attorney Docket Number:	12-1366 (071631)
Receipt Date:	24-MAY-2016
Filing Date:	02-MAY-2013
Time Stamp:	16:10:14
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		ROA.pdf	238163 <small>5ec31a9d5a1528d1999dfe776e24829a1fe551bb</small>	yes	16

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Amendment/Req. Reconsideration-After Non-Final Reject		1	1
Claims		2	10
Applicant Arguments/Remarks Made in an Amendment		11	16

Warnings:

Information:

Total Files Size (in bytes):	238163
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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.

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 13/875,749	Filing Date 05/02/2013	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	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).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
<small>* If the difference in column 1 is less than zero, enter "0" in column 2.</small>			TOTAL	

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
AMENDMENT	05/24/2016	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR			
		* 20	Minus	** 20	= 0	X \$80 = 0	
		* 4	Minus	***4	= 0	X \$420 = 0	
		<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
		<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					TOTAL ADD'L FEE	0	

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR			
		*	Minus	**	=	X \$ =	
		*	Minus	***	=	X \$ =	
		<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
		<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					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 number found in the appropriate box in column 1.

LIE
 /DESHONNE T. MARTINO/

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.
13/875,749	05/02/2013	Timothy Allen Murphy	12-1366 (071631)	6872
120226	7590	03/21/2016	EXAMINER	
Patterson & Sheridan - The Boeing Company c/o Patterson & Sheridan, LLP 24 GREENWAY PLAZA, SUITE 1600 Houston, TX 77046			MCGUE, FRANK J	
			ART UNIT	PAPER NUMBER
			3646	
			NOTIFICATION DATE	DELIVERY MODE
			03/21/2016	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):

PAIR_eofficeaction@pattersonsheridan.com
PatentAdmin@boeing.com
PSDocketing@pattersonsheridan.com

Office Action Summary**Application No.**
13/875,749**Applicant(s)**
MURPHY ET AL.**Examiner**
FRANK J. MCGUE**Art Unit**
3646**AIA (First Inventor to File)
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 24 February 2016.
 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) 1-20 is/are pending in the application.
5a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) 1-15 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 02 May 2013 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) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 3) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date <u>2 IDS attached</u> . | 4) <input type="checkbox"/> Other: _____ |

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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

Claims 16-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 24 February 2016.

The traversal is on the ground(s) that the inventions both measure angle of arrival. This is not found persuasive because even assuming applicant's assertion is accurate, the claims recite completely different elements. For example, claims 1-15 recite as structure inputs, processing module, comparator and output device while claims 16-20 use structures such as a solid state switch, ADC converter and an array antenna.

The requirement is still deemed proper and is therefore made FINAL.

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.

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Claim 14 is 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 pre-AIA the applicant regards as the invention.

Claim 14 recites the limitation "the multi-element array antenna" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

Claims 1-3, 6-8 and 11 are rejected under 35 U.S.C. 102(a)(2) as being anticipated by Andersson et al. (US Pat Pub 2011/0163908).

With regard to claim 1, Andersson et al. discloses an aircraft receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification of a target aircraft (para. 0004) comprising a first input for receiving ADS-B flight tracking information from

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the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft (para. 0016). Andersson et al. further discloses a second input for receiving positional information and heading information indicating the location and orientation of a multi-element array antenna (para. 0111) configured to be attached to the receiver (para. 0015). The receiver further comprises a processing module operative to generate a measured bearing derived from angle of arrival data, and generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation (paras. 0018-0019). The receiver further comprises a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft (para. 0020). The receiver further comprises an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft (para. 0023).

With regard to claim 2, in Andersson et al. the processing module is further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional information (para. 0068), the vector being based on receiving the positional information from a GNSS indicating location of the array antenna (para. 0071).

With regard to claim 3, in Andersson et al. the system includes an IRU indicating orientation of the array antenna (para. 0114). With regard to translating between an earth reference frame and an airplane reference frame, such translation cannot

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patentably distinguish the claim from Andersson et al. The reviewing court has held that nonfunctional descriptive material cannot lend patentability to an invention that would have been otherwise unpatentable over the prior art. *In re Ngai*, 367 F.3d 1336, 1339 (Fed. Cir. 2004). *Cf. In re Gulack*, 703 F.2d 1381, 1385 (Fed. Cir. 1983) (noting that when descriptive material is not functionally related to the substrate, the descriptive material will not distinguish the invention from the prior art in terms of patentability). *King Pharm., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1279 (Fed. Cir. 2010) (“[T]he relevant question is whether ‘there exists any new and unobvious functional relationship between the printed matter and the substrate.’”) (citations omitted). To take such a position would mean that translating the same data into a different reference frame is sufficient to warrant a separate patent, even if the remainder of the invention is unchanged. This would result not only in Applicant’s claimed type of data distinguishing over the prior art, but equally every single unique type of data (e.g., the same PVT data in any other reference frame) would distinguish over the prior art. To give effect to Applicant’s argument, we would need to ignore our reviewing court’s concerns with repeated patenting.

With regard to claim 6, Andersson et al. discloses an aircraft receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification (para. 0004) comprising a processing module receiving an ADS-B signal from a target aircraft including indicated positional data information (para. 0016). The processing module is further operative to generate a measured bearing derived from angle of arrival data of the ADS-B signal, and generate an expected bearing of the target aircraft derived from

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the indicated positional information of the ADS-B signal and the positional information and heading information of a location and orientation of a multi-element array antenna (paras. 0018-0019, 0111). The receiver further comprises a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B indicated positional data of the target aircraft (para. 0020). An output device for outputs an indication of authenticity based on verifying the ADS-B indicated positional data of the target aircraft (para. 0023).

With regard to claim 7, in Andersson et al. the processing module is further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional data (para. 0068), the vector being based on receiving the positional information from a GNSS indicating location of the array antenna (para. 0071).

With regard to claim 8, in Andersson et al. the system includes an IRU indicating orientation of the array antenna (para. 0114). With regard to translating between an earth reference frame and an airplane reference frame, such translation cannot patentably distinguish the claim from Andersson et al. The reviewing court has held that nonfunctional descriptive material cannot lend patentability to an invention that would have been otherwise unpatentable over the prior art. *In re Ngai*, 367 F.3d 1336, 1339 (Fed. Cir. 2004). *Cf. In re Gulack*, 703 F.2d 1381, 1385 (Fed. Cir. 1983) (noting that when descriptive material is not functionally related to the substrate, the descriptive material will not distinguish the invention from the prior art in terms of patentability). *King Pharm., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1279 (Fed. Cir. 2010)

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("[T]he relevant question is whether 'there exists any new and unobvious functional relationship between the printed matter and the substrate.'") (citations omitted). To take such a position would mean that translating the same data into a different reference frame is sufficient to warrant a separate patent, even if the remainder of the invention is unchanged. This would result not only in Applicant's claimed type of data distinguishing over the prior art, but equally every single unique type of data (e.g., the same PVT data in any other reference frame) would distinguish over the prior art. To give effect to Applicant's argument, we would need to ignore our reviewing court's concerns with repeated patenting.

With regard to claim 11, Andersson et al. discloses a system for Automatic Dependent Surveillance Broadcast (ADS-B) verification(para. 0004) comprising an antenna array assembly having a multiple-element antenna array (paras. 0015, 0111) for receiving ADS-B signals from a target aircraft, the ADS-B signals including indicated positional data (para. 0016). The system further comprises a receiver configured to receive the ADS-B signals from the antenna array assembly (para. 0016) and to measure an angle of arrival of the ADS-B signals relative to the orientation of the antenna array assembly (para. 0111). The receiver comprises a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft (para. 0016). Andersson et al. further discloses a second input for receiving positional information and heading information indicating the location and orientation of the receiver(para. 0111). The receiver further comprises a processing module operative to

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generate a measured bearing derived from angle of arrival data, and generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation (paras. 0018-0019). The receiver further comprises a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft (para. 0020). The receiver further comprises an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft (para. 0023).

Claim Rejections - 35 USC § 103

In the event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art relied upon, and the rationale supporting the rejection, would be the same under either status.

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 of this title, 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.

Claims 4-5, 9-10 and 12-15 are rejected under 35 U.S.C. 103 as being unpatentable over Andersson et al. in view of Wild et al. (US Pat Pub 2012/0223811).

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With regard to claim 4, Wild et al show a processing module being operative to generate the measured bearing based on measuring a relative phase of a carrier signal identified in the first input (para. 0021). It would have been obvious to modify Andersson et al. by using the phase to measure a bearing as taught in Wild et al. in order to utilize this well-known technique with predictable results.

With regard to claim 5, Wild et al show a processing module having an A/D converter which transmits a synchronizing signal to a commutating array antenna that feeds the signals to the first input (para. 0034). It would have been obvious to modify Andersson et al. by using the A/D converter as taught in Wild et al. in order to utilize this well-known technique with predictable results.

With regard to claim 9, Wild et al show a processing module being operative to generate the measured bearing based on measuring a relative phase of a carrier signal identified in the first input (para. 0021). It would have been obvious to modify Andersson et al. by using the phase to measure a bearing as taught in Wild et al. in order to utilize this well-known technique with predictable results.

With regard to claim 10, Wild et al show a processing module having an A/D converter which transmits a synchronizing signal to a commutating array antenna that feeds the signals to the first input (para. 0034). It would have been obvious to modify Andersson et al. by using the A/D converter as taught in Wild et al. in order to utilize this well-known technique with predictable results.

With regard to claim 12, Wild et al show the antenna array including a commutating solid state switch that cycles between each antenna element (para. 0029).

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It would have been obvious to modify Andersson et al. by using the switch as taught in Wild et al. in order to utilize this well-known technique with predictable results.

With regard to claim 13, Wild et al show a processing module having an A/D converter which transmits a synchronizing signal to a commutating array antenna that feeds the signals to the first input (para. 0034). It would have been obvious to modify Andersson et al. by using the A/D converter as taught in Wild et al. in order to utilize this well-known technique with predictable results.

With regard to claim 14, in Wild et al. the processing module decodes the indicated positional data from one discrete digital data stream for a signal antenna element of the multi-element array antenna via an ADS-B signal demodulation process (para. 0033) and determine an expected AOA of the target derived from the decoded indicated positional data from the target transmitter and positional information defining a location of the receiver and heading information defining an orientation of the antenna array assembly (para. 0020). It would have been obvious to modify Andersson et al. by using the processing module as taught in Wild et al. in order to utilize this well-known technique with predictable results.

With regard to claim 15, in Andersson et al., the processing module is operative to compare the expected AOA to the measured AOA to and verify indicated positional data from the target transmitter in the received ADS-B signal (para. 0020). The processing module also provides an indication of authenticity based on verifying the indicated positional data from the target transmitter (para. 0023).

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Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Smith (US Pat Pub 2007/0109190) show an apparatus, method and program for detecting antenna failures. Ryan et al. (US Pat Pub 2012/0299763) has an aircraft system for determining an aircraft position.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRANK MCGUE whose telephone number is (571)270-5987. The examiner can normally be reached on Monday - Thursday, 7:00am to 3:30pm, Friday - Saturday, 7:00am to 11:00am.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. 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.

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/FRANK J MCGUE/
Primary Examiner, Art Unit 3646

Notice of References Cited	Application/Control No. 13/875,749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.	
	Examiner FRANK J. MCGUE	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-2007/0109190 A1	05-2007	Smith; Mark Dean	G01S7/4026	342/359
*	B	US-2011/0163908 A1	07-2011	Andersson; Svante	G01S5/0072	342/36
*	C	US-2012/0223811 A1	09-2012	Wild; Ben J.	G01S3/48	340/10.1
*	D	US-2012/0299763 A1	11-2012	Ryan; Dean E.	G01S5/08	342/37
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Inventor Name Search Result

Your Search was:

Last Name = HARRIS

First Name = WILLIAM

Application#	Patent#	PG Pub#	Status	Date Filed	Title	Examiner Name	Inventor Name
07987275	Not Issued		166	05/11/1993	NOVEL ANTIBODIES FOR TREATMENT AND PREVENTION OF INFECTION IN ANIMALS AND MAN	ADAMS,DONALD	HARRIS, WILLIAM J.
07989814	Not Issued		161	12/14/1992	BRANCHED POLYBENZAZOLE POLYMERS AND METHOD OF PREPARATION	BEMBENICK,BRIAN	HARRIS, WILLIAM J.
08126685	Not Issued		168	09/24/1993	BLOCK COPOLYMERS CONTAINING BLOCKS OF POLYBENZAZOLE POLYMER AND BLOCKS OF POLYBENZOXAZINONE POLYMER OR POLYOXADIAZOLE POLYMER	PEZZUTO,HELEN	HARRIS, WILLIAM J.
08207996	5646253		150	03/08/1994	RECOMBINANT HUMAN ANTI-LK26 ANTIBODIES	EISENSCHENK,FRANK	HARRIS, WILLIAM J.
08234133	Not Issued		161	04/28/1994	RECOMBINANT HUMAN ANTI-VARICELLA ZOSTER VIRUS ANTIBODIES	JOHNSON,NANCY	HARRIS, WILLIAM J.
08275052	Not Issued		161	07/13/1994	RECOMBINANT HUMAN ANTI-CYTOMEGALOVIRUS ANTIBODIES	GRASER,JENNIFER	HARRIS, WILLIAM J.
08275053	5607847		250	07/13/1994	RECOMBINANT HUMAN ANTI-HUMAN IMMUNODEFICIENCY VIRUS ANTIBODY	BURKE,JULIE	HARRIS, WILLIAM J.
08290961	Not Issued		161	12/19/1994	ALTERED ANTIBODIES, PRODUCTS AND PROCESSES RELATING THERETO	SAUNDERS,DAVID	HARRIS, WILLIAM J.
08313029	Not Issued		161	11/28/1994	RECOMBINANT SPECIFIC BINDING PROTEIN	ADAMS,DONALD	HARRIS, WILLIAM J.
08331775	5919892		150	10/31/1994	POLYAMIC ACIDS AND METHODS TO CONVERT POLYAMIC ACIDS INTO POLYIMIDEBENZOXAZOLE FILMS	MULLIS,JEFFREY	HARRIS, WILLIAM J.
08344280	Not Issued		161	11/23/1994	RECOMBINANT HUMAN ANTI-RABIES VIRUS ANTIBODIES	BURKE,JULIE	HARRIS, WILLIAM J.
08388672	5795961		150	02/14/1995	RECOMBINANT HUMAN	UNGAR,SUSAN	HARRIS,

					ANTI-LEWIS B ANTIBODIES		WILLIAM J.
<u>08390899</u>	Not Issued		161	02/16/1995	NOVEL ANTIBODIES FOR THE TREATMENT AND PREVENTION OF INFECTION IN ANIMALS AND MAN	GAMBEL,PHILLIP	HARRIS, WILLIAM J.
<u>08428815</u>	<u>5741585</u>		150	04/24/1995	POLYAMIC ACID PRECURSORS AND METHODS FOR PREPARING HIGHER MOLECULAR WEIGHT POLYAMIC ACIDS AND POLYIMIDEBENZOXAZOLE	ACQUAH,SAMUEL	HARRIS, WILLIAM J.
<u>08435516</u>	<u>6500931</u>		250	05/04/1995	HUMANIZED ANTIBODIES TO FC RECEPTORS FOR IMMUNOGLOBULIN G ON HUMAN MONONUCLEAR PHAGOCYTES	BANSAL,GEETHA	HARRIS, WILLIAM J.
<u>08461780</u>	Not Issued		166	06/05/1995	NOVEL ANTIBODIES FOR TREATMENT AND PREVENTION OF INFECTION IN ANIMALS AND MAN	EISENSCHENK,FRANK	HARRIS, WILLIAM J.
<u>08462469</u>	Not Issued		166	06/05/1995	NOVEL ANTIBODIES FOR TREATMENT AND PREVENTION OF INFECTION IN ANIMALS AND MAN	EISENSCHENK,FRANK	HARRIS, WILLIAM J.
<u>08486856</u>	Not Issued		161	10/07/1995	RECOMBINANT HUMAN ANTI-ATHEROSCLEROTIC PLAQUE ANTIBODIES	GAMBEL,PHILLIP	HARRIS, WILLIAM J.
<u>08593747</u>	Not Issued		161	01/29/1996	SYSTEM FOR INITIATING TELECOMMUNICATIONS SERVICES THROUGH ALTERNATIVE NETWORK SIGNALING	HONG,HARRY	HARRIS, WILLIAM J.
<u>08748087</u>	Not Issued		161	11/12/1996	NOVEL ANTIBODIES FOR TREATMENT AND PREVENTION OF INFECTION IN ANIMALS AND MAN	NOLAN,PATRICK	HARRIS, WILLIAM J.
<u>08760840</u>	<u>5952484</u>		150	12/05/1996	RECOMBINANT HUMAN ANTI-LK26 ANTIBODIES	HUFF,SHEELA	HARRIS, WILLIAM J.
<u>08783716</u>	Not Issued		161	01/16/1997	NOVEL ANTIBODIES FOR TREATMENT AND PREVENTION OF INFECTION IN ANIMALS AND MAN	CUNNINGHAM,THOMAS	HARRIS, WILLIAM J.
<u>08784501</u>	Not Issued		161	01/17/1997	NOVEL ANTIBODIES FOR TREATMENT AND PREVENTION OF INFECTION IN ANIMALS AND MAN	CUNNINGHAM,THOMAS	HARRIS, WILLIAM J.
<u>08874139</u>	<u>6145583</u>		150	06/13/1997	INSPECTION DEVICE	FORD,JOHN	HARRIS, WILLIAM J.
<u>09027701</u>	<u>5985969</u>		150	02/23/1998	POLYAMIC ACID PRECURSORS AND	NUTTER,NATHAN	HARRIS, WILLIAM

					METHODS FOR PREPARING HIGHER MOLECULAR WEIGHT POLYAMIC ACIDS AND POLYIMIDEBENZOXAZOLE		J.
<u>09080554</u>	<u>6025481</u>		150	05/18/1998	ISOLATED NUCLETIC ACID MOLECULES WHICH ENCODE HUMAN ANTI-LEWIS B ANTI- BODIES	UNGAR,SUSAN	HARRIS, WILLIAM J.
<u>60019784</u>	Not Issued		159	06/14/1996	INSPECTION DEVICE		HARRIS, WILLIAM J.
<u>60029694</u>	Not Issued		159	10/31/1996	HUMANIZED MONOCLONAL ANTIBODIES SPECIFIC TO CARCINOEMBRYONIC ANTIGEN (CEA), METHODS FOR THIER MANUFACTURE AND USAGE IN THE TREATMENT OR DIAGNOSIS OF CANCER		HARRIS, WILLIAM J.
<u>60030173</u>	Not Issued		159	10/31/1996	HUMANIZED MONOCLONAL ANTIBODIES SPECIFIC TO TAG-72, METHODS FOR THEIR MANUFACTURE AND USAGE IN THE TREATMENT OR DIAGNOSIS OF CANCER		HARRIS, WILLIAM J.
<u>60096488</u>	Not Issued		159	08/14/1998	ARTICLES WITH IMPROVED DIMENSIONAL STABILITY VIA MODIFIED POLYETHYLENE TEREPHTHALATES		HARRIS, WILLIAM J.
<u>60833724</u>	Not Issued		159	07/27/2006	Communicating security device network		HARRIS, WILLIAM J.
<u>29247370</u>	<u>D575011</u>		150	06/14/2006	PAINTBRUSH CLEANING DEVICE	SIMS,KATHLEEN	HARRIS, WILLIAM JOHN
<u>09602709</u>	<u>6348195</u>		150	06/26/2000	METHOD FOR TREATING CANCERS	HUFF,SHEELA	HARRIS, WILLIAM JOSEPH
<u>09266119</u>	<u>6124106</u>		150	03/10/1999	METHOD FOR DETECTING CANCERS	HUFF,SHEELA	HARRIS, WILLIAM JOSEPH
<u>07549386</u>	<u>5227970</u>		150	07/06/1990	METHODS AND SYSTEMS FOR UPDATING GROUP MAILING LISTS	BODENDORF,ANDREW	HARRIS, WILLIAM K.
<u>10146810</u>	<u>6773223</u>	20030215320	150	05/17/2002	HYDRAULIC ATTACHMENT LATCH MECHANISM FOR SKID STEER LOADER	UNDERWOOD,DONALD	HARRIS, WILLIAM L.
<u>07036646</u>	Not Issued		161	04/10/1987	METHOD FOR INCREASING THE HEMATOCRIT OF A NORMAL MAMMAL	KUSHAN,JEFFREY	HARRIS, WILLIAM L.
<u>07348348</u>	<u>4936810</u>		150	05/05/1989	CROP THINNING ELEMENTS FOR AXIAL	BUIZ,MIKADO	HARRIS, WILLIAM

					FLOW COMBINE		L.
07409223	5541158		150	09/19/1989	METHOD FOR INCREASING THE HEMATOCRIT OF A NORMAL MAMMAL	HOBBS,LISA	HARRIS, WILLIAM L.
08124871	Not Issued		161	09/22/1993	TEMPERATURE-PHASED ANAEROBIC WASTE TREATMENT PROCESS	WYSE,THOMAS	HARRIS, WILLIAM L.
08316860	5525228		150	10/03/1994	TEMPERATURE-PHASED ANAEROBIC WASTE TREATMENT PROCESS	WYSE,THOMAS	HARRIS, WILLIAM L.
08529867	5712977		150	09/18/1995	METHOD AND APPARATUS FOR INITIAL COUNTRY SELECTION IN A UNIVERSAL MODEM WITH CABLE	PAN,DANIEL	HARRIS, WILLIAM L.
08531991	Not Issued		161	09/21/1995	METHOD FOR INCREASING THE HEMATOCRIT OF A NORMAL MAMMAL	STEADMAN,DAVID	HARRIS, WILLIAM L.
08656607	5746919		250	05/31/1996	TEMPERATURE-PHASED ANAEROBIC WASTE TREATMENT PROCESS	WYSE,THOMAS	HARRIS, WILLIAM L.
09343815	6738815		150	06/30/1999	SYSTEMS AND METHODS FOR UTILIZING A COMMUNICATIONS NETWORK FOR PROVIDING MOBILE USERS ACCESS TO LEGACY SYSTEMS	LUU,LE	HARRIS, WILLIAM L.
60091373	Not Issued		159	07/01/1998	SYSTEM AND METHOD FOR PROVIDING ACCESS TO LEGACY SYSTEMS	,	HARRIS, WILLIAM L.
06783614	Not Issued		161	10/03/1985	TUFTED CUSHION INNERSOLE	ZARFAS,LOUIS	HARRIS, WILLIAM M.
13875749	Not Issued	20140327581	71	05/02/2013	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation	MCGUE,FRANK	HARRIS, WILLIAM MATTHEW
08582517	Not Issued		161	01/03/1996	MEAT TENDERIZER	LITTLE,WILLIS	HARRIS, WILLIAM N.
06880415	4675794		150	06/30/1986	ADJUSTABLE MOUNT FOR A HIGH INTENSITY LAMP	JONES,LARRY	HARRIS, WILLIAM O.

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			Filing Date	May 2, 2013
			First Named Inventor	Timothy A. Murphy
			Art Unit	3646
			Examiner Name	Not Yet Assigned
(Use as many sheets as necessary)			Attorney Docket Number	12-1366/60055.0205US01
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		Number-Kind Code ₂ (if known)				
		2011/0163908	07/07/2011	Andersson, et al.		
		2007/0109190	05/17/2007	Smith		
		2012/0223811	09/06/2012	Wild, et al.		
		2012/0299763	11/29/2012	Ryan, et al.		
Foreign Patent Documents						
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	1	8169357		2012-05-01	Bruno et al.	
	2	8102301		2012-01-24	Mosher	
	3	8072382		2011-12-06	Smith et al.	
	4	8063816		2011-11-22	Troxel	
	5	8130135		2012-03-06	Donovan	
	6	8004452		2011-08-23	Rolfe et al.	
	7	7383124		2008-06-03	Vesel	
	8	7956795		2011-06-07	Bruno et al.	

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	9	7570214		2009-08-04	Smith et al.	
	10	7761196		2010-07-20	Brandao et al.	
	11	7880667		2011-02-01	Lanzkron	
	12	7423590		2008-09-09	Smith	
	13	7495612		2009-02-24	Smith	
	14	7730307		2010-06-01	Viggiano et al.	
	15	7414567		2008-08-19	Zhang et al.	
	16	7342514		2008-03-11	Bailey et al.	
	17	6952631		2005-10-04	Griffith et al.	
	18	6681158		2004-01-20	Griffith et al.	
	19	6473003		2002-10-29	Horvath et al.	

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	20	7961136		2011-06-14	Stefani et al.	
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See attached certification statement.

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A certification statement is not submitted herewith.

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Signature	/Donald J. Lecher/	Date (YYYY-MM-DD)	2013-05-02
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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.

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Application#	Patent#	PG Pub#	Status	Date Filed	Title	Examiner Name	Inventor Name
<u>90009398</u>	Not Issued		454	02/03/2009	METHOD AND APPARATUS FOR SIMULATING A JAM SESSION AND INSTRUCTING A USER IN HOW TO PLAY THE DRUMS	GAGLIARDI,ALBERT	MURPHY (3RD PTY REQ.), TIMOTHY M.
<u>90013160</u>	Not Issued		454	02/24/2014	COMPRESSOR CONTROL SYSTEM USING A VARIABLE GEOMETRY DIFFUSER	JASTRZAB,JEFFREY	MURPHY(3RD.PTY.REQ.), TIMOTHY J.
<u>90009384</u>	Not Issued		454	02/03/2009	METHOD AND APPARATUS FOR SIMULATING A JAM SESSION AND INSTRUCTING A USER IN HOW TO PLAY THE DRUMS	HUGHES,DEANDRA	MURPHY(3RD.PTY.REQ.), TIMOTHY M.
<u>95000409</u>	Not Issued		854	10/27/2008	METHOD AND APPARATUS FOR SIMULATING A JAM SESSION AND INSTRUCTING A USER IN HOW TO PLAY THE DRUMS	GAGLIARDI,ALBERT	MURPHY, ESQ(3RD.PTY.REQ.), TIMOTHY M
<u>06771010</u>	Not Issued		161	08/30/1985	SETBACK GAMEBOARD	NOT,DEFINED	MURPHY, TIMOTHY
<u>07559952</u>	<u>5583508</u>		250	07/31/1990	METHODS AND SYSTEMS OF ATTITUDE DETERMINATION	SOTOMAYOR,JOHN	MURPHY, TIMOTHY
<u>10068016</u>	<u>6916291</u>	20020165466	150	02/05/2002	SYSTEMS, METHODS AND PRODUCTS FOR DIAGNOSTIC HEARING ASSESSMENTS DISTRIBUTED VIA THE USE OF A COMPUTER NETWORK	SZMAL,BRIAN	MURPHY, TIMOTHY
<u>10975372</u>	Not Issued	20050060258	161	10/29/2004	Customer funds transfer system and method	CHENCINSKI,SIEGFRIED	MURPHY, TIMOTHY
<u>11113560</u>	<u>7530957</u>	20050192515	150	04/25/2005	SYSTEMS, METHODS AND PRODUCTS FOR DIAGNOSTIC HEARING ASSESSMENTS DISTRIBUTED VIA THE USE OF A COMPUTER NETWORK	SZMAL,BRIAN	MURPHY, TIMOTHY
<u>11340958</u>	Not	20070178525	161	01/27/2006	Livestock health	HURT,SHARON	MURPHY, TIMOTHY

	Issued				management		
<u>11567544</u>	<u>7729972</u>	20080140547	150	12/06/2006	METHODOLOGIES AND SYSTEMS FOR TRADE EXECUTION AND RECORDKEEPING IN A FUND OF HEDGE FUNDS ENVIRONMENT	HAMILTON,SARA	MURPHY, TIMOTHY
<u>12256096</u>	<u>7854704</u>	20090062687	150	10/22/2008	SYSTEMS, METHODS AND PRODUCTS FOR DIAGNOSTIC HEARING ASSESSMENTS DISTRIBUTED VIA THE USE OF A COMPUTER NETWORK	SZMAL,BRIAN	MURPHY, TIMOTHY
<u>12944368</u>	<u>8287462</u>	20110060244	150	11/11/2010	SYSTEMS, METHODS AND PRODUCTS FOR DIAGNOSTIC HEARING ASSESSMENTS DISTRIBUTED VIA THE USE OF A COMPUTER NETWORK	SZMAL,BRIAN	MURPHY, TIMOTHY
<u>13610190</u>	<u>8777869</u>	20130006140	150	09/11/2012	SYSTEMS, METHODS AND PRODUCTS FOR DIAGNOSTIC HEARING ASSESSMENTS DISTRIBUTED VIA THE USE OF A COMPUTER NETWORK	SZMAL,BRIAN	MURPHY, TIMOTHY
<u>13627048</u>	<u>9247272</u>	20130091220	150	09/26/2012	NETWORK OF COLLABORATIVE ONLINE SHOWS	HABTEMARIAM,MELAKU	MURPHY, TIMOTHY
<u>14862592</u>	Not Issued	0	30	09/23/2015	REMOVABLE VASCULAR OCCLUSION DEVICE	ZALUKAEVA,TATYANA	MURPHY, TIMOTHY
<u>14979230</u>	Not Issued	0	30	12/22/2015	NETWORK OF COLLABORATIVE ONLINE SHOWS	HABTEMARIAM,MELAKU	MURPHY, TIMOTHY
<u>60917215</u>	Not Issued		159	05/10/2007	Cutting Head Bearing Arrangement For Blast Hole Drilling Machine	,	MURPHY, TIMOTHY
<u>60943389</u>	Not Issued		159	06/12/2007	FIREARM GRIP EXTENSION	,	MURPHY, TIMOTHY
<u>61037023</u>	Not Issued		159	03/17/2008	Web Production with Increased Process Efficiency	,	MURPHY, TIMOTHY
<u>61413793</u>	Not Issued		159	11/15/2010	Methods and Apparatus for Distributed Data Storage	,	MURPHY, TIMOTHY
<u>61543762</u>	Not Issued		159	10/05/2011	Collaborative Online Shows	,	MURPHY, TIMOTHY
<u>61621706</u>	Not Issued		159	04/09/2012	Vascular access device and method	,	MURPHY, TIMOTHY
<u>61639317</u>	Not Issued		159	04/27/2012	Methods and Device for Closure of Large-bore Arterial Access	,	MURPHY, TIMOTHY
<u>61640031</u>	Not		159	04/30/2012	Temporary Dialysis	,	MURPHY, TIMOTHY

	Issued				Vascular Access Occluder Device and Method of Demonstrating Arterial End of Dialysis Vascular Access During Diagnostic Dialysis Fistulography		
<u>61649894</u>	Not Issued		159	05/21/2012	Network of Instant Micro Forums for Interactive Displays		MURPHY, TIMOTHY
<u>61684197</u>	Not Issued		159	08/17/2012	Polymer Microsphere for Chemoembolization		MURPHY, TIMOTHY
<u>61856731</u>	Not Issued		159	07/21/2013	NEPHROSTOMY OR OTHER DRAINAGE CATHETER WITH AUXILIARY GUIDEWIRE LUMEN AND METHODS OF USE THEREOF		MURPHY, TIMOTHY
<u>61907737</u>	Not Issued		159	11/22/2013	Enteral Feeding Tube Device with Removable Inner Lumen and Method for Placement Thereof		MURPHY, TIMOTHY
<u>61930997</u>	Not Issued		159	01/24/2014	DYNAMIC MEDIA PAIRING		MURPHY, TIMOTHY
<u>62046375</u>	Not Issued		159	09/05/2014	SYSTEM AND METHOD FOR CONTROLLING PAPER SHEET MOISTURE FOR INCREASED PRODUCTION		MURPHY, TIMOTHY
<u>62056215</u>	Not Issued		159	09/26/2014	REMOVABLE VASCULAR OCCLUSION DEVICE		MURPHY, TIMOTHY
<u>62193778</u>	Not Issued		20	07/17/2015	SYSTEM AND METHOD FOR CONVERTING A LIST OF GENERIC PRODUCT CATEGORIES INTO A SPECIFIC CUSTOMIZABLE PRODUCT LIST		MURPHY, TIMOTHY
<u>62244839</u>	Not Issued		20	10/22/2015	Catheter-delivered Transarterial Method for Treatment of Addiction-reward Behaviors		MURPHY, TIMOTHY
<u>62245855</u>	Not Issued		20	10/23/2015	ADAPTER FOR POOL CLEANING SYSTEM		MURPHY, TIMOTHY
<u>62257108</u>	Not Issued		20	11/18/2015	CLEANING HEAD FOR AN IN-FLOOR POOL CLEANING SYSTEM		MURPHY, TIMOTHY
<u>14167767</u>	<u>8911515</u>	20140144069	150	01/29/2014	CANDLE AND CANDLE WAX CONTAINING METATHESIS AND METATHESIS-LIKE PRODUCTS	WEISS,PAMELA	MURPHY, TIMOTHY A
<u>09519812</u>	Not Issued		161	03/06/2000	Method for making a candle	TOOMER,CEPHIA	MURPHY, TIMOTHY A.

09854138	6503285	0	150	05/11/2001	TRIACYLGLYCEROL BASED CANDLE WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
09877716	6645261	20020157303	150	06/08/2001	TRIACYLGLYCEROL-BASED ALTERNATIVE TO PARAFFIN WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
09963104	7128766	20030057599	150	09/25/2001	TRIACYLGLYCEROL BASED WAX COMPOSITION	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
09972355	6674398	20030067409	250	10/05/2001	METHOD AND APPARATUS FOR PROVIDING AN INTEGRATED COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SATELLITE SYSTEM	ISSING,GREGORY	MURPHY, TIMOTHY A.
10011240	Not Issued		160	11/05/2001	Method for making a candle		MURPHY, TIMOTHY A.
10092341	6824572	20030017431	150	03/05/2002	VEGETABLE OIL BASED WAX COMPOSITIONS	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
10284272	6770104	20030110683	150	10/30/2002	TRIACYLGLYCEROL BASED CANDLE WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
10292378	6797020	20040088907	150	11/12/2002	TRIACYLGLYCEROL BASED WAX FOR USE IN CONTAINER CANDLES	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
10292403	6773469	20040088908	150	11/12/2002	TRIACYLGLYCEROL BASED WAX FOR USE IN CANDLES	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
10434447	7192457	20040221503	150	05/08/2003	WAX AND WAX-BASED PRODUCTS	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
10655945	7217301	20040047886	150	09/05/2003	TRIACYLGLYCEROL-BASED ALTERNATIVE TO PARAFFIN WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
10738314	6963304	20040130841	150	12/17/2003	METHOD AND APPARATUS FOR PROVIDING AN INTEGRATED COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SATELLITE SYSTEM	ISSING,GREGORY	MURPHY, TIMOTHY A.

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Application#	Patent#	PG Pub#	Status	Date Filed	Title	Examiner Name	Inventor Name
10778725	7373223	20050182530	150	02/13/2004	GLOBAL NAVIGATION SATELLITE SYSTEM LANDING SYSTEMS AND METHODS	WEISKOPF,MARIE	MURPHY, TIMOTHY A.
10863662	7462205	20040221504	150	06/08/2004	TRIACYLGLYCEROL BASED CANDLE WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
10950127	7637968	20050060927	150	09/24/2004	TRIACYLGLYCEROL BASED WAX FOR USE IN CONTAINER CANDLES	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
11005737	Not Issued		161	12/07/2004	Reversible axle caster wheel	KYLE,MICHAEL	MURPHY, TIMOTHY A.
11205910	7362262	20050285780	150	08/17/2005	METHOD AND APPARATUS FOR PROVIDING AN INTEGRATED COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SATELLITE SYSTEM	ISSING,GREGORY	MURPHY, TIMOTHY A.
11205917	7414573	20070241957	150	08/17/2005	METHOD AND APPARATUS FOR PROVIDING AN INTEGRATED COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SATELLITE SYSTEM	ISSING,GREGORY	MURPHY, TIMOTHY A.
11205918	Not Issued	20060061506	161	08/17/2005	Method and apparatus for providing an integrated communications, navigation and surveillance satellite system	ISSING,GREGORY	MURPHY, TIMOTHY A.
11502977	7833294	20060272200	150	08/11/2006	WAX AND WAX-BASED PRODUCTS	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
11588734	8021443	20070039237	150	10/27/2006	TRIACYLGLYCEROL BASED WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY

					COMPOSITION		A.
<u>11745566</u>	Not Issued	20080279981	163	05/08/2007	RUMINANT FEEDS CONTAINING pH-ADJUSTED EDIBLE BYPRODUCTS AND HIGH DIGESTIVE EFFICIENCY GRAINS	SAYALA,CHHAYA	MURPHY, TIMOTHY A.
<u>11764595</u>	Not Issued	20080311246	161	06/18/2007	METHOD OF PRODUCING RUMINANT-EDIBLE FEED PRODUCTS	LEFF,STEVEN	MURPHY, TIMOTHY A.
<u>11795052</u>	<u>8685118</u>	20090217568	150	05/15/2008	Candle and candle wax containing metathesis and metathesis-like products	WEISS,PAMELA	MURPHY, TIMOTHY A.
<u>11801851</u>	<u>8202329</u>	20070282000	150	05/11/2007	TRIACYLGLYCEROL-BASED ALTERNATIVE TO PARAFFIN WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
<u>12269628</u>	<u>8070833</u>	20090119977	150	11/12/2008	TRIACYLGLYCEROL BASED CANDLE WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
<u>12281931</u>	<u>8888908</u>	20090126602	150	01/15/2009	COLORANT COMPOSITIONS COMPRISING METATHESIZED UNSATURATED POLYOL ESTERS	POURBOHLOUL,SARIRA	MURPHY, TIMOTHY A.
<u>12281938</u>	<u>8815257</u>	20090220443	150	12/11/2008	COMPOSITIONS COMPRISING METATHESIZED UNSATURATED POLYOL ESTERS	ROGERS,JAMES	MURPHY, TIMOTHY A.
<u>12323489</u>	<u>8263919</u>	20100057285	150	11/26/2008	UNMANNED SURVEILLANCE VEHICLE	KREINER,MICHAEL	MURPHY, TIMOTHY A.
<u>12627732</u>	<u>8551194</u>	20100132250	150	11/30/2009	PRILLED WAXES COMPRISING SMALL PARTICLES AND SMOOTH-SIDED COMPRESSION CANDLES MADE THEREFROM	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
<u>12637123</u>	<u>8652221</u>	20100205851	150	12/14/2009	HYBRID WAX COMPOSITIONS FOR USE IN COMPRESSION MOLDED WAX ARTICLES SUCH AS CANDLES	GRAHAM,CHANTEL	MURPHY, TIMOTHY A.
<u>12711091</u>	Not Issued	20100136176	163	02/23/2010	RUMINANT FEEDS CONTAINING pH-ADJUSTED EDIBLE BYPRODUCTS AND HIGH DIGESTIVE EFFICIENCY GRAINS	SAYALA,CHHAYA	MURPHY, TIMOTHY A.

<u>12787745</u>	<u>8342867</u>	20120108094	150	05/26/2010	FREE FLOATING CONNECTOR ENGAGEMENT AND RETENTION SYSTEM AND METHOD FOR ESTABLISHING A TEMPORARY ELECTRICAL CONNECTION	NGUYEN,PHUONGCHI	MURPHY, TIMOTHY A.
<u>12903570</u>	<u>8157873</u>	20110165529	150	10/13/2010	WAX AND WAX-BASED PRODUCTS	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
<u>13042077</u>	<u>8500826</u>	20110219667	150	03/07/2011	LIPID-BASED WAX COMPOSITIONS SUBSTANTIALLY FREE OF FAT BLOOM AND METHODS OF MAKING	WEISS,PAMELA	MURPHY, TIMOTHY A.
<u>13101515</u>	<u>8641814</u>	20110277661	150	05/05/2011	NATURAL OIL BASED MARKING COMPOSITIONS AND THEIR METHODS OF MAKING	FAISON,VERONICA	MURPHY, TIMOTHY A.
<u>13151097</u>	Not Issued	20110236559	161	06/01/2011	METHOD OF PRODUCING RUMINANT-EDIBLE FEED PRODUCTS	LEFF,STEVEN	MURPHY, TIMOTHY A.
<u>13301401</u>	Not Issued	20120124892	71	11/21/2011	LIPID-BASED WAX COMPOSITIONS SUBSTANTIALLY FREE OF FAT BLOOM AND METHODS OF MAKING	GRAHAM,CHANTEL	MURPHY, TIMOTHY A.
<u>13446853</u>	<u>9159241</u>		150	04/13/2012	METHODS, SYSTEMS, AND APPARATUS FOR SYNTHETIC INSTRUMENT LANDING SYSTEM (SILS)	MAHNE,KEVIN	MURPHY, TIMOTHY A.
<u>13472100</u>	<u>8529924</u>	20120225944	150	05/15/2012	TRIACYGLYCEROL-BASED ALTERNATIVE TO PARAFFIN WAX	TOOMER,CEPHIA	MURPHY, TIMOTHY A.
<u>13585245</u>	<u>8869671</u>	20140048654	150	08/14/2012	AIRCRAFT DEVICE DEPLOYMENT SYSTEM WITH SPRING-DRIVEN MECHANICAL LINKAGE	LEE,BENJAMIN	MURPHY, TIMOTHY A.
<u>13920779</u>	<u>8876919</u>	20130285286	150	06/18/2013	LIPID-BASED WAX COMPOSITIONS SUBSTANTIALLY FREE OF FAT BLOOM AND METHODS OF MAKING	WEISS,PAMELA	MURPHY, TIMOTHY A.

<u>14179194</u>	Not Issued	20140230314	161	02/12/2014	WAX COMPOSITIONS AND THE EFFECT OF METALS ON BURN RATES	HINES,LATOSHA	MURPHY, TIMOTHY A.
<u>14330997</u>	Not Issued	20140357714	30	07/14/2014	COMPOSITIONS COMPRISING METATHESIZED UNSATURATED POLYOL ESTERS	ROGERS,JAMES	MURPHY, TIMOTHY A.
<u>14678123</u>	Not Issued	20150210855	41	04/03/2015	METHODS OF MAKING HIGH-WEIGHT ESTERS, ACIDS, AND DERIVATIVES THEREOF	CUTLIFF,YATE	MURPHY, TIMOTHY A.
<u>14856989</u>	Not Issued	0	30	09/17/2015	REUSABLE RESETTABLE RETRIGGERABLE REBUILDABLE SQUIBLESS MISSILE BATTERY	RUDDOCK,ULA	MURPHY, TIMOTHY A.
<u>14966863</u>	Not Issued	0	30	12/11/2015	Wax Compositions and the Effect of Metals on Burn Rates	HINES,LATOSHA	MURPHY, TIMOTHY A.
<u>15053971</u>	Not Issued	0	17	02/25/2016	Systems and Methods for Providing Emergency Location Functionality	,	MURPHY, TIMOTHY A.
<u>15053982</u>	Not Issued	0	17	02/25/2016	Emergency Locator Transmitter Activation Device for Enhanced Emergency Location Performance	,	MURPHY, TIMOTHY A.
<u>15054000</u>	Not Issued	0	17	02/25/2016	Integrated Interface Architecture and Control Logic for Enhanced Emergency Location Functionality	,	MURPHY, TIMOTHY A.
<u>60273647</u>	Not Issued		159	03/06/2001	Vegetable oil based wax compositions	,	MURPHY, TIMOTHY A.
<u>60528365</u>	Not Issued		159	12/09/2003	Reversible axle caster wheel	,	MURPHY, TIMOTHY A.
<u>60642600</u>	Not Issued		159	01/10/2005	Candle and candle wax containing metathesis and metathesis-like products	,	MURPHY, TIMOTHY A.
<u>60642601</u>	Not Issued		159	01/10/2005	Compositions including metathesis and metathesis-like components	,	MURPHY, TIMOTHY A.
<u>60690122</u>	Not Issued		159	06/13/2005	Candle and candle wax containing metathesis and metathesis-like products	,	MURPHY, TIMOTHY A.

60780125	Not Issued		159	03/07/2006	Compositions comprising metathesized unsaturated polyol esters		MURPHY, TIMOTHY A.
60780127	Not Issued		159	03/07/2006	Colorant compositions comprising metathesized unsaturated polyol esters		MURPHY, TIMOTHY A.
60932338	Not Issued		159	05/30/2007	Prilled waxes comprising small particles and smooth-sided compression candles made therefrom		MURPHY, TIMOTHY A.
61092159	Not Issued		159	08/27/2008	UNMANNED SURVEILLANCE VEHICLE		MURPHY, TIMOTHY A.
61265555	Not Issued		159	12/01/2009	FREE FLOATING CONNECTOR ENGAGEMENT AND RETENTION SYSTEM AND METHOD		MURPHY, TIMOTHY A.
61312578	Not Issued		159	03/10/2010	LIPID-BASED WAX COMPOSITIONS SUBSTANTIALLY FREE OF FAT BLOOM AND METHODS OF MAKING		MURPHY, TIMOTHY A.
61333814	Not Issued		159	05/12/2010	NATURAL OIL BASED MARKING COMPOSITIONS AND THEIR METHODS OF MAKING		MURPHY, TIMOTHY A.

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Application#	Patent#	PG Pub#	Status	Date Filed	Title	Examiner Name	Inventor Name
61416586	Not Issued		159	11/23/2010	LIPID-BASED WAX COMPOSITIONS SUBSTANTIALLY FREE OF FAT BLOOM AND METHODS OF MAKING		MURPHY, TIMOTHY A.
61476120	Not Issued		159	04/15/2011	METHODS, SYSTEMS, AND APPARATUS FOR SYNTHETIC INSTRUMENT LANDING SYSTEM (SILS)		MURPHY, TIMOTHY A.
61765753	Not Issued		159	02/17/2013	WAX COMPOSITIONS AND THE EFFECT OF METALS ON BURN RATES		MURPHY, TIMOTHY A.
61861345	Not Issued		159	08/01/2013	METHODS OF MAKING HIGH-WEIGHT ESTERS, ACIDS, AND DERIVATIVES THEREOF		MURPHY, TIMOTHY A.
06944091	Not Issued		166	12/22/1986	STEERABLE BEAM ANTENNA SYSTEM USING BUTLER MATRIX	BLUM,THEODORE	MURPHY, TIMOTHY A.
07271401	4882588		150	11/14/1988	STEERABLE BEAM ANTENNA SYSTEM USING BUTLER MATRIX	BLUM,THEODORE	MURPHY, TIMOTHY A.
07342266	5233358		150	04/24/1989	ANTENNA BEAM FORMING SYSTEM	ISSING,GREGORY	MURPHY, TIMOTHY A.
07434059	Not Issued		161	11/08/1989	SATELLITE BEAM-FORMING NETWORK SYSTEM HAVING IMPROVED BEAM SHAPING	ISSING,GREGORY	MURPHY, TIMOTHY A.
08075197	5378992		150	06/10/1993	METHOD AND APPARATUS FOR THE LOOP SELF	DO,DIEP	MURPHY, TIMOTHY A.

					IMPEDANCE OF SHIELDED RATIO OF SENSE CURRENT PROBE AND THE CURRENT TRANSFORMER RATIO OF DRIVE CURRENT PROBE		
<u>08268053</u>	<u>5463317</u>		150	06/29/1994	SHIELD INTEGRITY MONITOR	SOLIS,JOSE	MURPHY, TIMOTHY A.
<u>08720715</u>	<u>5786773</u>		150	10/02/1996	LOCAL-AREA AUGMENTATION SYSTEM FOR SATELLITE NAVIGATION PRECISION-APPROACH SYSTEM	TONG,NINA	MURPHY, TIMOTHY A.
<u>08761432</u>	<u>5995043</u>		150	12/06/1996	AIRCRAFT SATELLITE NAVIGATION PRECISION-APPROACH SYSTEM INCLUDING CDMA DATALINK	BLUM,THEODORE	MURPHY, TIMOTHY A.
<u>11854217</u>	<u>7970503</u>	20090069960	150	09/12/2007	METHOD AND APPARATUS FOR DETECTING ANOMALIES IN LANDING SYSTEMS UTILIZING A GLOBAL NAVIGATION SATELLITE SYSTEM	ZANELLI,MICHAEL	MURPHY, TIMOTHY ALLEN
<u>12535731</u>	<u>8494693</u>	20110035080	150	08/05/2009	VERTICAL REQUIRED NAVIGATION PERFORMANCE CONTAINMENT WITH RADIO ALTITUDE	NGUYEN,CUONG	MURPHY, TIMOTHY ALLEN
<u>13085310</u>	<u>8630756</u>	20120265376	150	04/12/2011	Airplane Position Assurance Monitor	DO,TRUC	MURPHY, TIMOTHY ALLEN
<u>13875749</u>	Not Issued	20140327581	71	05/02/2013	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation	MCGUE,FRANK	MURPHY, TIMOTHY ALLEN
<u>13920355</u>	<u>8798819</u>	20130282209	150	06/18/2013	VERTICAL REQUIRED NAVIGATION PERFORMANCE CONTAINMENT WITH RADIO	NGUYEN,CUONG	MURPHY, TIMOTHY ALLEN

					ALTITUDE		
<u>14100245</u>	<u>9257050</u>	20140100720	150	12/09/2013	Airplane Position Assurance Monitor	DO,TRUC	MURPHY, TIMOTHY ALLEN
<u>14832851</u>	Not Issued	0	30	08/21/2015	Aircraft Distress Tracking and Interface to Search and Rescue System	KEITH,JACK	MURPHY, TIMOTHY ALLEN
<u>14832879</u>	Not Issued	0	30	08/21/2015	Aircraft Tracking Method and Device and Method of Installation	KEITH,JACK	MURPHY, TIMOTHY ALLEN
<u>14858235</u>	Not Issued	0	30	09/18/2015	Controller for an Aircraft Tracker	MALHOTRA,SANJEEV	MURPHY, TIMOTHY ALLEN
<u>12436052</u>	<u>8332345</u>		150	05/05/2009	SYSTEMS & METHODS FOR PAIRING OF A SEMANTIC NETWORK AND A KNOWLEDGE SHARING REPOSITORY	HOLMES,MICHAEL	MURPHY, TIMOTHY ANDREW
<u>12621478</u>	<u>8442940</u>		150	11/18/2009	SYSTEMS & METHODS FOR PAIRING OF A SEMANTIC NETWORK AND A NATURAL LANGUAGE PROCESSING INFORMATION EXTRACTION SYSTEM	NEWAY,SAMUEL	MURPHY, TIMOTHY ANDREW
<u>13673647</u>	<u>8700555</u>		150	11/09/2012	SYSTEMS & METHODS FOR PAIRING OF A SEMANTIC NETWORK AND A KNOWLEDGE SHARING REPOSITORY	HOLMES,MICHAEL	MURPHY, TIMOTHY ANDREW
<u>13856726</u>	<u>9298702</u>		150	04/04/2013	SYSTEMS & METHODS FOR PAIRING OF A SEMANTIC NETWORK AND A NATURAL LANGUAGE PROCESSING INFORMATION EXTRACTION SYSTEM	NEWAY,SAMUEL	MURPHY, TIMOTHY ANDREW
<u>61050588</u>	Not Issued		159	05/05/2008	Pairing of a Semantic Network and a Knowledge Sharing Repository		MURPHY, TIMOTHY ANDREW

<u>61115543</u>	Not Issued		159	11/18/2008	Pairing of a Semantic Network and a Natural Language Processing Information Extraction System		MURPHY, TIMOTHY ANDREW
<u>10118528</u>	Not Issued	20030135399	161	04/05/2002	System and method for project optimization	STERRETT, JONATHAN	MURPHY, TIMOTHY BRIAN
<u>60349119</u>	Not Issued		159	01/16/2002	Integrated value system and method		MURPHY, TIMOTHY BRIAN
<u>10114802</u>	<u>6565244</u>		250	04/02/2002	SINGLE SOURCE IDENTIFICATION LIGHT BAR	ALAVI, ALI	MURPHY, TIMOTHY C.
<u>06646820</u>	Not Issued		161	09/04/1984	WIRING HARNESS SECTION FOR TRAILER VEHICLE	MCQUADE, JOHN	MURPHY, TIMOTHY C.
<u>07107240</u>	Not Issued		166	10/29/1987	DISPOSABLE, PRE-PACKAGED DEVICE FOR CONDUCTING IMMUNOASSAY PROCEDURES	ALEXANDER, LYLE	MURPHY, TIMOTHY C.
<u>07404061</u>	<u>4999163</u>		250	09/08/1989	DISPOSABLE, PRE-PACKAGED DEVICE FOR CONDUCTING IMMUNOASSAY PROCEDURES	ALEXANDER, LYLE	MURPHY, TIMOTHY C.
<u>29017461</u>	<u>D359681</u>		150	01/10/1994	DISPOSABLE STORAGE CONTAINER	DESHMUKH, PRABHAKAR	MURPHY, TIMOTHY D.
<u>09589244</u>	<u>6303469</u>		250	06/07/2000	Thin Microelectronic substrates and methods of manufacture	TOLEDO, FERNANDO	MURPHY, TIMOTHY E.
<u>09846057</u>	<u>6693342</u>	20010051415	250	04/30/2001	THIN MICROELECTRONIC SUBSTRATES AND METHODS OF MANUFACTURE	TOLEDO, FERNANDO	MURPHY, TIMOTHY E.
<u>10646608</u>	<u>6914317</u>	20040038500	250	08/21/2003	THIN MICROELECTRONIC SUBSTRATES AND METHODS OF MANUFACTURE	TOLEDO, FERNANDO	MURPHY, TIMOTHY E.
<u>12243271</u>	Not Issued	20090241968	163	10/01/2008	Athletic Protection Device	HAWTHORNE, OPHELIA	MURPHY, TIMOTHY E.
<u>13769678</u>	Not Issued	20140053325	167	02/18/2013	ATHLETIC PROTECTION DEVICE	HAWTHORNE, OPHELIA	MURPHY, TIMOTHY E.
<u>61041347</u>	Not Issued		159	04/01/2008	Athletic Protection Device		MURPHY, TIMOTHY ERROL
<u>09536107</u>	<u>6640152</u>		150	03/24/2000	MODELING AND CONTROL OF SHEET WEIGHT AND MOISTURE FOR PAPER	JARRETT, RYAN	MURPHY, TIMOTHY F

					MACHINE TRANSITION		
09572640	6584372		150	05/17/2000	DYE RATE CONTROL FOR PAPER WEB COLOR CHANGE	CABRERA,ZOILA	MURPHY, TIMOTHY F.
09742686	7110467	20020118766	250	12/20/2000	PERFORMANCE EVALUATION OF A G.DMT-COMPLIANT DIGITAL SUBSCRIBER LINE SYSTEM	PERILLA,JASON	MURPHY, TIMOTHY F.
09780503	6740499	20020001820	150	02/09/2001	METHOD FOR DETECTING BACTERIAL EXACERBATIONS OF CHRONIC LUNG DISEASE	LEARY,LOUISE	MURPHY, TIMOTHY F.
10298130	7277517	0	150	11/15/2002	METHOD FOR ACHIEVING SYMBOL ALIGNMENT TO A PRE-EXISTING ADSL DATA EXCHANGE	CORRIELUS,JEAN	MURPHY, TIMOTHY F.
10843056	Not Issued	20050265219	161	05/11/2004	Orthogonal frequency division multiplex (OFDM) packet detect unit, method of detecting an OFDM packet and OFDM receiver employing the same	MEW,KEVIN	MURPHY, TIMOTHY F.
11096850	7429388	20050266030	150	04/01/2005	VACCINE FOR NONTYPEABLE HAEMOPHILUS INFLUENZAE INFECTION	DEVI,SARVAMANGALA	MURPHY, TIMOTHY F.
11581550	Not Issued	20070122872	161	10/16/2006	Method for storage of clinical samples prior to culture	DUFFY,PATRICIA	MURPHY, TIMOTHY F.
12193398	Not Issued	20090092629	161	08/18/2008	VACCINE FOR NONTYPEABLE HAEMOPHILUS INFLUENZAE INFECTION	DEVI,SARVAMANGALA	MURPHY, TIMOTHY F.
12345430	7811589	20090169577	150	12/29/2008	METHOD FOR STIMULATING IMMUNE RESPONSE AGAINST MORAXELLA CATARRHALIS	GRASER,JENNIFER	MURPHY, TIMOTHY F.

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Inventor Name Search Result

Your Search was:

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First Name = WILLIAM

Application#	Patent#	PG Pub#	Status	Date Filed	Title	Examiner Name	Inventor Name
07349282	4942331		150	05/09/1989	FILAMENT ALIGNMENT SPUD FOR INCANDESCENT LAMPS	WIEDER,KENNETH	HARRIS, WILLIAM O.
07413816	5039904		150	09/28/1989	MOUNT FOR MINIATURE ARC LAMP	HORABIK,MICHAEL	HARRIS, WILLIAM O.
07622037	5064992		150	12/04/1990	APPARATUS FOR WELDING COMPONENTS	ALBRITTON,CLARENCE	HARRIS, WILLIAM O.
07622080	5125558		150	12/04/1990	METHOD FOR WELDING COMPONENTS	HEINRICH,SAMUEL	HARRIS, WILLIAM O.
07778396	5176036		250	10/16/1991	PARALLEL SHAFT DRIVE AND INDEXING MACHINE	HERRMANN,ALLAN	HARRIS, WILLIAM O.
07838864	5170546		250	02/21/1992	INDEXING MACHINE WITH ROTARY CAM DRIVE	BRIGGS,WILLIAM	HARRIS, WILLIAM O.
07846051	5176240		250	03/05/1992	INDEXING MACHINE WITH ROLLER CAM DRIVE	VALENZA,JOSEPH	HARRIS, WILLIAM O.
10295249	Not Issued		161	11/15/2002	Speech translator device and method of using	YEN,ERIC	HARRIS, WILLIAM P.
11176809	Not Issued		161	07/07/2005	Auxiliary carpet cleaning wand handle	DANIEL,JAMAL	HARRIS, WILLIAM P.
13066193	Not Issued	20110256006	161	04/08/2011	Apparatus for removing standing water	FREAY,CHARLES	HARRIS, WILLIAM P.
61342046	Not Issued		159	04/08/2010	Apparatus for removing standing water	,	HARRIS, WILLIAM P.
06603506	4574544		150	04/24/1984	INSULATING ROOF SYSTEM FOR MANUFACTURED HOMES AND COMMERICAL STRUCTURES	NOT,DEFINED	HARRIS, WILLIAM P.
08446110	5567870		150	05/19/1995	BALL TESTER	NOORI,MASOUD	HARRIS, WILLIAM P.
29028489	Not Issued		164	09/16/1994	SOCK CLIP	WEBSTER,ROBIN	HARRIS, WILLIAM P.
61908114	Not Issued		160	11/24/2013	Rotary_Carpet_Cleaning_Extraction_Tools	,	HARRIS, WILLIAM PATRICK
62124225	Not Issued		159	12/12/2014	Floor cleaning device and improvements	,	HARRIS, WILLIAM PATRICK
10291013	Not	20040028561	161	11/08/2002	System for the detection of pathogens in	ALEXANDER,LYLE	HARRIS,

	Issued				the mail stream		WILLIAM R.
<u>10341033</u>	Not Issued		161	01/13/2003	System and method for processing hazardous mail	CAMPBELL,SHANNON	HARRIS, WILLIAM R.
<u>10819793</u>	Not Issued	20050228738	161	04/08/2004	Base line futures contract (BLC)	MERCHANT,SHAHID	HARRIS, WILLIAM R.
<u>11032276</u>	<u>7331836</u>		250	01/10/2005	AQUATIC APPAREL	VASUDEVA,AJAY	HARRIS, WILLIAM R.
<u>12032845</u>	Not Issued		160	02/18/2008	Aquatic Apparel		HARRIS, WILLIAM R.
<u>12118215</u>	<u>7933532</u>	20090279915	150	05/09/2008	METHOD AND APPARATUS FOR GENERATING A SPREAD SPECTRUM SIGNAL IN A PRINTER POWER SUPPLY UNIT	GRAINGER,QUANA	HARRIS, WILLIAM R.
<u>12393500</u>	<u>8402440</u>	20100005454	150	02/26/2009	PROGRAM VERIFICATION THROUGH SYMBOLIC ENUMERATION OF CONTROL PATH PROGRAMS	BROPHY,MATTHEW	HARRIS, WILLIAM R.
<u>12403037</u>	<u>8102629</u>	20100231229	150	03/12/2009	LEAKAGE CURRENT COMPENSATION FOR HIGH VOLTAGE TRANSFORMERS	FLEMING,FRITZ	HARRIS, WILLIAM R.
<u>60538737</u>	Not Issued		159	01/23/2004	Aquatic apparel		HARRIS, WILLIAM R.
<u>61078565</u>	Not Issued		159	07/07/2008	Enhancing Symbolic Execution with Infeasible Cores		HARRIS, WILLIAM R.
<u>61338684</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology for speeding stroke rehabilitation and recovery and ameliorization of secondary psychological problems		HARRIS, WILLIAM R.
<u>61338685</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology to enhance and accelerate addiction recovery		HARRIS, WILLIAM R.
<u>61338686</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology to reduce symptoms of anxiety and anxiety disorders		HARRIS, WILLIAM R.
<u>61338687</u>	Not Issued		159	02/23/2010	Method of using binaural beat technology for reducing symptoms of insomnia and general sleep disorders		HARRIS, WILLIAM R.
<u>61338691</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology for the reduction of psychological stress and related secondary psychological problems		HARRIS, WILLIAM R.
<u>61338692</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology for reducing symptoms of pre-operative anxiety		HARRIS, WILLIAM R.
<u>61338693</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology to minimize or prevent jetlag		HARRIS, WILLIAM R.
<u>61338694</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology for reducing symptoms of post traumatic stress disorder		HARRIS, WILLIAM R.
<u>61338695</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology for reducing symptoms of chronic pain		HARRIS, WILLIAM R.
<u>61338703</u>	Not Issued		159	02/23/2010	Method for using binaural beat technology to improve behavioral and cognitive symptoms in autism sufferers		HARRIS, WILLIAM R.
<u>61338705</u>	Not		159	02/23/2010	Method for using binaural beat technology		HARRIS,


	Issued				for improving symptoms of traumatic brain injury and secondary psychological and behavioral problems		WILLIAM R.
61338714	Not Issued		159	02/23/2010	Method for using binaural beat technology for improving symptoms of chronic fatigue syndrome		HARRIS, WILLIAM R.
61338715	Not Issued		159	02/23/2010	Method for using binaural beat technology for reducing symptoms of depression and related psychological problems		HARRIS, WILLIAM R.
61338716	Not Issued		159	02/23/2010	Method for using binaural beat technology to reduce symptoms of attention deficit disorder and attention deficit hyperactivity disorder		HARRIS, WILLIAM R.
61583872	Not Issued		159	01/06/2012	Retractable Snowboard Reel		HARRIS, WILLIAM R.
06065000	4264359		150	08/08/1979	JEWELRY ALLOY	DEAN,RICHARD	HARRIS, WILLIAM R.
06222152	4370164		150	01/02/1981	YELLOW METAL ALLOY	SHEEHAN,JOHN	HARRIS, WILLIAM R.
08396469	5577759		150	03/02/1995	HIGH CLEARANCE TRAILERS FOR USE IN AGRICULTURAL HARVESTING OF MULTI-HARVEST CROPS	RICE,KENNETH	HARRIS, WILLIAM R.
08785994	5819961		250	01/21/1997	PORTABLE VALET	WILKENS,JANET	HARRIS, WILLIAM R.
09066692	6591263		250	04/27/1998	MULTI-MODAL TRAVELER INFORMATION SYSTEM	CORRIELUS,JEAN	HARRIS, WILLIAM R.
09148645	5950845		250	09/04/1998	FLUSH MOUNTED VALET	HARRIS,ERICA	HARRIS, WILLIAM R.
29044858	D374745		150	10/02/1995	COMBINED TOOTHPICK AND CASE HAVING KEY RING	CHIN,KAY	HARRIS, WILLIAM R.
60010388	Not Issued		159	01/22/1996	PORTABLE VALET		HARRIS, WILLIAM R.
60058158	Not Issued		159	09/08/1997	WALL MOUNTED VALET		HARRIS, WILLIAM R.

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Search Notes 	Application/Control No. 13875749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.
	Examiner FRANK J MCGUE	Art Unit 3646

CPC- SEARCHED		
Symbol	Date	Examiner
G01S3/043, G01S3/46, G01S5/0072, G01S5/021, G01S5/08	14 March 2016	FJM

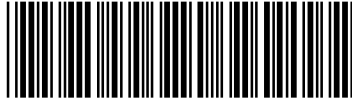
CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
342	417	14 March 2016	FJM

SEARCH NOTES		
Search Notes	Date	Examiner
inventor name search completed, class searching, text searching	14 March 2016	FJM

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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<i>Index of Claims</i> 	Application/Control No. 13875749	Applicant(s)/Patent Under Reexamination MURPHY ET AL.
	Examiner FRANK J MCGUE	Art Unit 3646

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

Claims renumbered in the same order as presented by applicant
 CPA
 T.D.
 R.1.47

CLAIM		DATE							
Final	Original	03/14/2016							
	1	✓							
	2	✓							
	3	✓							
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	14	✓							
	15	✓							
	16	N							
	17	N							
	18	N							
	19	N							
	20	N							

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	938	342/417	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L2	8	G01S3/043	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L3	1007	G01S3/46	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L4	57	G01S5/0072	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L5	102	G01S5/021	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L6	269	G01S5/08	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L7	2368	L1 L2 L3 L4 L5 L6	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L8	2368	L7	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:04
L9	210348	@pd>="20160204"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:06
L10	28	I7 and I9	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:06

L11	63	("8130135" "8169357" "7880667" "7961136" "8004452" "20070109190" "6681158" "6952631" "7383124" "7414567" "6473003" "7342514" "7730307" "8072382" "20110163908" "7956795" "8063816" "7570214" "20120223811" "7423590" "7495612" "7761196" "8102301" "20120299763").FN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/03/14 17:18
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S2	934	342/417	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:06
S3	7	G01S3/043	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:06
S4	1002	G01S3/46	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S5	51	G01S5/0072	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S6	94	G01S5/021	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S7	261	G01S5/08	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S8	2337	S2 S3 S4 S5 S6 S7	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:07
S9	1618	(automatic adj dependent adj surveillance adj broadcast) ADSB "ADSB"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:08

S10	26	S8 and S9	US- PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/02/04 08:08
S11	2664721	phase	US- PGPUB; USPAT	OR	ON	2016/02/04 09:00

3/ 14/ 2016 5:21:00 PM

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Murphy, et al.	§ § § § § §	Filed: May 2, 2013
Serial No.: 13/875,749		Group Art Unit: 3646
Confirmation No.: 6872		Examiner: Frank J. MCGUE

For: **DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL
MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION**

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<u>February 24, 2016</u> Date	<u>/C. Alexandra Livingston/</u> C. Alexandra Livingston

RESPONSE TO RESTRICTION REQUIREMENT DATED FEBRUARY 10, 2016

In response to the Restriction Requirement dated February 10, 2016, having a shortened statutory period for response set to expire on April 10, 2016, please enter this response and reconsider the claims pending in the application for reasons discussed below. While no fees are believed due, the Commissioner is hereby authorized to charge counsel's Deposit Account No. 20-0782 / 12-1366 (071631) / GGM for any fees, including extension of time fees or excess claim fees, required to make this response timely and acceptable to the Office.

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper. Remarks/Arguments begin on page 11 of this paper.

IN THE CLAIMS:

Please amend the claims as follows:

1. (Currently Amended) An aircraft receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification of a target aircraft, comprising:

a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft;

a second input for receiving positional information and heading information indicating the location and orientation of a multi-element array antenna configured to be attached to the receiver;

a processing module operative to:

generate a measured bearing derived from angle of arrival data, and

generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation;

a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

2. (Original) The aircraft receiver according to claim 1, wherein the processing module being further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional information,

wherein computing the vector being based on receiving the positional information from a Global Navigation Surveillance System (GNSS) indicating the location of the multi-element array antenna.

3. (Original) The aircraft receiver according to claim 2, wherein the processing module being further operative translate the vector from an earth reference frame to an airplane reference frame based the heading information including pitch, roll and heading data generated from an Inertial Reference Unit (IRU) indicating the orientation of the multi-element array antenna.

4. (Original) The aircraft receiver according to claim 1, wherein the processing module being further operative generate the measured bearing based on measuring a relative phase of a carrier signal identified in the first input.

5. (Original) The aircraft receiver according to claim 1, further comprising an Analog-to-Digital (A/D) converter for processing signals received on the first input,

wherein the A/D processing transmits a synchronizing signal to a commutating multiple-element array antenna that feeds the signals to the first input.

6. (Currently Amended) A receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification, comprising:

a processing module receiving an ADS-B signal from a target aircraft including indicated positional data, and operative ~~[[to]]~~ to:

generate a measured bearing derived from detection of an angle of arrival of the ADS-B signal, and

generate an expected bearing of the target aircraft derived from the indicated positional data of the ADS-B signal, and positional and heading information of a location and orientation of a multi-element array antenna configured to be attached to the receiver;

a comparator for comparing the expected bearing to the measured bearing and for verifying the ADS-B indicated positional data of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B indicated positional data of the target aircraft.

7. (Original) The receiver according to claim 6, wherein the processing module being further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional data,

wherein computing the vector being based on receiving the positional information from a Global Navigation Satellite System (GNSS) indicating the location of the multi-element array antenna.

8. (Original) The receiver according to claim 7, wherein the processing module being further operative to translate the vector from an earth reference frame to an airplane reference frame based the heading information including pitch, roll and heading data generated from an Inertial Reference Unit (IRU) indicating the orientation of the multi-element array antenna.

9. (Original) The receiver according to claim 6, wherein the processing module being further operative to generate the measured bearing based on measuring a relative phase of a carrier signal of the ADS-B signal from the target aircraft.

10. (Original) The receiver according to claim 6, further comprising an Analog-to-Digital (A/D) converter processing ADS-B signals received from the target aircraft,

wherein the A/D processing is synchronized to a commutating multiple-element array antenna feeding the ADS-B signals to the receiver.

11. (Currently Amended) A system for automatic dependent surveillance broadcast (ADS-B) verification, comprising:

an antenna array assembly having a multiple-element antenna array for receiving ADS-B signals from a target aircraft, the ADS-B signals including indicated positional data; and

a receiver configured to receive the ADS-B signals from the antenna array assembly and to measure an angle of arrival of the ADS-B signals relative to the orientation of the antenna array assembly, wherein the receiver comprises:

a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft;

a second input for receiving positional information and heading information indicating the location and orientation of the receiver;

a processing module operative to:

generate a measured bearing derived from angle of arrival data,

and

generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation; and

a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft;

and

an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

12. (Original) The system according to claim 11, where the antenna array assembly further comprises a commutating solid state switch that cycles between each antenna element of a multi-element array antenna.

13. (Original) The system according to claim 12, where the receiver further comprises an analog-to-digital (A/D) converter that receives the ADS-B signals and controls the cycling of the commutating solid state switch with a synchronization signal.

14. (Original) The system according to claim 11, wherein the processing module being further operative to decode the indicated positional data from the target transmitter from one discrete digital data stream for a single antenna element of the multi-element array antenna via an ADS-B signal demodulation process; and

determine an expected AOA of the target transmitter derived from the decoded indicated positional data from the target transmitter, and positional information defining a location of the receiver and heading information defining an orientation of the antenna array assembly.

15. (Original) The system according to claim 14, wherein the processing module being further operative to compare the expected AOA to the measured AOA to verify the indicated positional data from the target transmitter in the received ADS-B signal; and

provide an indication of authenticity based on verifying the indicated positional data from the target transmitter.

16. (Original) A method of measuring an Angle of Arrival (AOA), comprising:

cycling a commutating solid state switch between each antenna element of a multi-element array antenna based on a synchronization signal received from a receiver system;

receiving at least one signal at the multi-element array antenna so that a time multiplexed RF signal is received at an output of the commutating solid state switch;

converting the time multiplexed RF signal at an analog-to-digital (A/D) converter based on the synchronization signal into a plurality of antenna element specific digital samples for each discrete signal;

de-multiplexing the plurality of antenna element specific digital samples into discrete digital data streams for each antenna element of the multi-element array antenna; and

determining a measured AOA of the at least one signal based on measuring a relative phase of a carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna.

17. (Original) The method according to claim 16, where the signal comprises an ADS-B signal including indicated positional data from a target transmitter.

18. (Original) The method according to claim 17, further comprising:

decoding the indicated positional data from the target transmitter from one discrete digital data stream for a single antenna element of the multi-element array antenna via an ADS-B signal demodulation process;

determining an expected AOA of the target transmitter derived from the decoded indicated positional data from the target transmitter, and positional information defining a location of the receiver system and heading information defining an orientation of an antenna subsystem of the receiver system;

comparing the expected AOA to the measured AOA to verify the indicated positional data from the target transmitter in the received ADS-B signal; and

providing an indication of authenticity based on verifying the indicated positional data from the target transmitter.

19. (Original) The method according to claim 16, where the at least one signal comprises a plurality of signals from at least two emitters of signals of opportunity.

20. (Original) The method according to claim 19, further comprising:

retrieving an identity for each respective emitter from a database;

determine a location for each emitter based on the identity for each respective emitter from the database;

determining AOAs for each signal from the respective emitters based on measuring the relative phase of the carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna; and

compute an independent position fix of the antenna subsystem of the receiver system based on the AOAs locations and each respective emitter location.

REMARKS

This is intended as a full and complete response to the Restriction Requirement dated February 22, 2016, having a shortened statutory period for response set to expire on April 22, 2016. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-20 are pending in the application. Claims 1-20 remain pending following entry of this response. Claims 1, 6, and 11 have been amended. Applicants submit that the amendments do not introduce new matter.

Election / Restrictions

Claims 1-20 stand restricted under 35 U.S.C. 121 as follows:

- Group I Claims 1-15, drawn to "a ADS-B verification receiver and system",
classified in class G01S3/043.
- Group II Claims 16-20, drawn to "a method of measuring AOA", classified in
class G01S1/08.

The Examiner states that:

“The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are directed to ADS-B systems. The inventions are distinct (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect or (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants (MPEP § 806.05(j)). In the instant case, the inventions as claimed have materially different functions namely, verification of ADS-B data versus determining AOA which do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants.

Applicants provisionally elect, with traverse, the claims of Group I (claims 1-15) for examination. There are two criteria for a proper requirement for restriction between

patentably distinct inventions: (A) The inventions must be independent or distinct as claimed; and (B) There would be a serious burden on the examiner if restriction is not required. (MPEP § 803). Applicants submit that the Examiner has not properly established or satisfied the criteria for a proper requirement for restriction.

Applicants submit that the Examiner has incorrectly mischaracterized the distinction between the Group I and II claims. Specifically, the Examiner asserts that “the inventions as claimed have materially different functions namely, verification of ADS-B data versus determining AOA which do not encompass overlapping subject matter.” *Restriction Requirement*, p. 2. Both groups of claims, however, include calculating AOA values. For example, independent claims 1, 6, and 11 recite “generate a measured bearing derived from detection of an angle of arrival” data, while independent claim 16 is “[a] method of measuring an Angle of Arrival” that includes “determining a measured AOA of the at least one signal.” Because of this overlap, Applicants submit that this is not a search and/or examination burden that warrants a restriction. Therefore, Applicants submit that the restriction requirement is improper and respectfully requests withdrawal of the restriction requirement.

Conclusion

Having addressed all issues set out in the Restriction Requirement, Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted, and
S-signed pursuant to 37 CFR 1.4,

/Gero G. MCCLELLAN/

Gero G. McClellan
Registration No. 44,227
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Attorney for Applicant

Electronic Acknowledgement Receipt

EFS ID:	25013468
Application Number:	13875749
International Application Number:	
Confirmation Number:	6872
Title of Invention:	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation
First Named Inventor/Applicant Name:	Timothy Allen Murphy
Customer Number:	120226
Filer:	Gero G. McClellan/Alexandra Livingston
Filer Authorized By:	Gero G. McClellan
Attorney Docket Number:	12-1366 (071631)
Receipt Date:	24-FEB-2016
Filing Date:	02-MAY-2013
Time Stamp:	18:25:33
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	Response to Election / Restriction Filed	RespResReq.pdf	105670 <small>264f150690ea31ca21a5056235bd979319d5e101</small>	no	13

Warnings:

Information:

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.

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 13/875,749	Filing Date 05/02/2013	<input type="checkbox"/> To be Mailed
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ENTITY: LARGE SMALL MICRO

APPLICATION AS FILED – PART I

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	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).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
<small>* If the difference in column 1 is less than zero, enter "0" in column 2.</small>			TOTAL	

APPLICATION AS AMENDED – PART II

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
AMENDMENT	02/24/2016	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR			
		* 20	Minus	** 20	= 0	X \$80 = 0	
		* 4	Minus	***4	= 0	X \$420 = 0	
		<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
		<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					TOTAL ADD'L FEE	0	

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR			
		*	Minus	**	=	X \$ =	
		*	Minus	***	=	X \$ =	
		<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
		<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					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 number found in the appropriate box in column 1.

LIE
/PATRICIA F. LEWIS/

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.
13/875,749	05/02/2013	Timothy Allen Murphy	12-1366 (071631)	6872
120226	7590	02/10/2016	EXAMINER	
Patterson & Sheridan - The Boeing Company c/o Patterson & Sheridan, LLP 24 GREENWAY PLAZA, SUITE 1600 Houston, TX 77046			MCGUE, FRANK J	
			ART UNIT	PAPER NUMBER
			3646	
			NOTIFICATION DATE	DELIVERY MODE
			02/10/2016	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):

PAIR_eofficeaction@pattersonsheridan.com
PatentAdmin@boeing.com
PSDocketing@pattersonsheridan.com

Office Action Summary	Application No. 13/875,749	Applicant(s) MURPHY ET AL.	
	Examiner FRANK J. MCGUE	Art Unit 3646	AIA (First Inventor to File) 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 2 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 26 January 2015.
 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) 1-20 is/are pending in the application.
5a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 6) Claim(s) _____ is/are allowed.
- 7) Claim(s) _____ is/are rejected.
- 8) Claim(s) _____ is/are objected to.
- 9) Claim(s) 1-20 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) <input type="checkbox"/> Notice of References Cited (PTO-892) | 3) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b)
Paper No(s)/Mail Date _____ | 4) <input type="checkbox"/> Other: _____ |

Art Unit: 3646

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

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

I. Claims 1-15, drawn to a ADS-B verification receiver and system, classified in G01S3/043; and.

II. Claim 16-20, drawn to a method of measuring AOA, classified in G01S1/08.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are directed to ADS-B systems. The inventions are distinct if: (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed have materially different functions namely, verification of ADS-B data versus determining AOA which do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants. There is a search and/or examination burden for the patentably distinct related inventions due to their mutually exclusive characteristics.

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Restriction for examination purposes as indicated is proper because all these 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:

The inventions require a different field of search (e.g., searching different classes/subclasses or electronic resources, or employing different search queries) and/or 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 an 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

Art Unit: 3646

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.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be corrected in compliance with 37 CFR 1.48(a) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. A request to correct inventorship under 37 CFR 1.48(a) must be accompanied by an application data sheet in accordance with 37 CFR 1.76 that identifies each inventor by his or her legal name and by the processing fee required under 37 CFR 1.17(i).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRANK J. MCGUE whose telephone number is (571)270-5987. The examiner can normally be reached on Sunday - Tuesday, Friday - Saturday, 9:00am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. 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.

Art Unit: 3646

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

/FRANK J MCGUE/
Primary Examiner, Art Unit 3646



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/875,749	05/02/2013	Timothy Allen Murphy	12-1366 / 60055.0205US01

CONFIRMATION NO. 6872

POA ACCEPTANCE LETTER

120226
The Boeing Company
100 North Riverside
Chicago, IL 60606



Date Mailed: 02/03/2015

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/26/2015.

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

/zmoguss/

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



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/875,749	05/02/2013	Timothy Allen Murphy	12-1366 / 60055.0205US01

CONFIRMATION NO. 6872

POWER OF ATTORNEY NOTICE



75741
Baldauff IP, LLC
505 Highlands Overlook
Roswell, GA 30075

Date Mailed: 02/03/2015

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/26/2015.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/zmoguss/

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

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

Practitioners associated with Customer Number:

120226

OR

Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

The address associated with Customer Number:

120226

OR

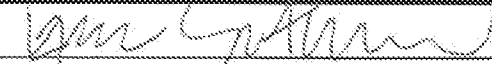
Firm or Individual Name			
Address			
City	State	Zip	
Country			
Telephone	Email		

Assignee Name and Address: The Boeing Company
100 N. Riverside Plaza
Chicago, IL 60606

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature		Date June 12, 2014
Name	Eric Satermo	Telephone 714-896-4626
Title	Assistant Secretary of The Boeing Company	

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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.

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.

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: Murphy et al.

Application No./Patent No.: 13/875,749 Filed/Issue Date: May 2, 2013

Titled: Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication...

The Boeing Company, 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:

[Empty box for listing other parties]

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:

[Empty box for listing other parties]

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 030391, Frame 0964, 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.

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.

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)

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: _____

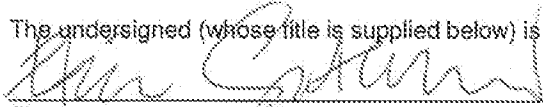
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

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 302.06]

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



Signature

June 12, 2014

Date

Eric Satermo

Printed or Typed Name

Asst. Secretary of The Boeing Company

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.

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

Electronic Acknowledgement Receipt

EFS ID:	21310630
Application Number:	13875749
International Application Number:	
Confirmation Number:	6872
Title of Invention:	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation
First Named Inventor/Applicant Name:	Timothy Allen Murphy
Customer Number:	75741
Filer:	Gero G. McClellan/Stephanie Dominguez
Filer Authorized By:	Gero G. McClellan
Attorney Docket Number:	12-1366 / 60055.0205US01
Receipt Date:	26-JAN-2015
Filing Date:	02-MAY-2013
Time Stamp:	16:15:26
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		POA.pdf	1266806 b32c633e7572ef7a596d160fdb3b0a651fff4 dda	yes	5

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Power of Attorney		1	2
Assignee showing of ownership per 37 CFR 3.73.		3	5

Warnings:

Information:

Total Files Size (in bytes):	1266806
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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.



UNITED STATES PATENT AND TRADEMARK OFFICE

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

Table with 4 columns: APPLICATION NUMBER (13/875,749), FILING OR 371(C) DATE (05/02/2013), FIRST NAMED APPLICANT (Timothy Allen Murphy), ATTY. DOCKET NO./TITLE (12-1366 / 60055.0205US01)

CONFIRMATION NO. 6872

PUBLICATION NOTICE



75741
Hope Baldauff, LLC
100 Colony Square
1175 Peachtree Street, N.E., Suite 2000
Atlanta, GA 30361

Title: Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation

Publication No. US-2014-0327581-A1

Publication Date: 11/06/2014

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 Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, 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 http://pair.uspto.gov/. 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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Timothy A. Murphy, et al.		
Application No.:	13/875,749	Examiner:	Not Yet Assigned
Filed:	May 2, 2013	Group Art Unit:	3646
Confirmation No.	6872	Docket:	12-1366/60055.0205US01
Title:	DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION		

Transmittal Form

Enclosures

<input checked="" type="checkbox"/> Transmittal Sheet <input type="checkbox"/> Response to: <input type="checkbox"/> Notice of Missing Parts <input type="checkbox"/> Informational Notice to Applicant <input type="checkbox"/> Notice to File Corrected Application Papers <input type="checkbox"/> Copy of _____ <input type="checkbox"/> Declaration <input type="checkbox"/> Newly Executed (_ pages) <input type="checkbox"/> Affidavit(s) / Declaration(s) <input type="checkbox"/> Submission of Formal Drawings <input type="checkbox"/> Drawing(s) (_ sheets) <input type="checkbox"/> Preliminary Amendment	<input type="checkbox"/> Reply / Amendment to: <input type="checkbox"/> Restriction Requirement <input type="checkbox"/> Non-Final Office Action <input type="checkbox"/> Request for Continued Examination (RCE) transmittal <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Notice of Appeal <input type="checkbox"/> Request for Pre-Appeal Brief Conference <input type="checkbox"/> Pre-Appeal Brief <input type="checkbox"/> Extension of Time <input type="checkbox"/> Issue Fee PTOL-85 <input type="checkbox"/> Fee Address Indication Form	<input type="checkbox"/> Petition <input type="checkbox"/> 1.47(a) Non-Signing Inventor <input type="checkbox"/> Attachments (Exhibits) <input type="checkbox"/> Declaration under 37 CFR 1.47(a) <input type="checkbox"/> Petition for _____ <input checked="" type="checkbox"/> Information Disclosure Statement with <input checked="" type="checkbox"/> Form PTO/-1449 (1 page) <input checked="" type="checkbox"/> <u>1</u> Non-Patent Reference(s) <input type="checkbox"/> <u> </u> Foreign Patent Reference(s) <input type="checkbox"/> Other: <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____
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Fees

Claims Remaining After Amendment	Total Claims	Highest Number Previously Paid For	Present Extra	Rate	Fee
Total Claims	-	20	= 0	X 80.00	= \$0.00
Independent Claims	-	3	= 0	X 420.00	= \$0.00
MULTIPLE DEPENDENT CLAIM FEE					\$0.00
OTHER:					\$.00
TOTAL FEE					\$.00

Method of Payment

<input type="checkbox"/> Credit Card	<input type="checkbox"/> Deposit Account Deposit Account Number: <u>50-3634</u> Deposit Account Name: <u>HB</u>
For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)	<input type="checkbox"/> Charge fee(s) indicated above <input type="checkbox"/> Credit any overpayments <input type="checkbox"/> Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17

Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers or any future reply, if appropriate. Please charge any additional fees or credit overpayment to Deposit Account No. 50-3634.

HOPE BALDAUFF, LLC 100 Colony Square 1175 Peachtree St., N.E., Suite 2000 Atlanta, Georgia 30361 (404) 815-1900	By: /Donald J. Lecher/ Name: Donald J. Lecher Reg. No.: 41,933 Date: September 19, 2014 DJL/mmt	75741 <small>PATENT TRADEMARK OFFICE</small>
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Timothy A. Murphy, et al.	Examiner:	Not Yet Assigned
Serial No.:	13/875,749	Group Art Unit:	3646
Filed:	May 2, 2013	Docket No.:	12-1366/60055.0205US01
Title:	DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION		

INFORMATION DISCLOSURE STATEMENT (37 C.F.R. § 1.97)

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

Dear Sir:

With regard to the above-identified application, the items of information listed on the enclosed Form 1449 are brought to the attention of the Examiner.

Consideration of the items listed is respectfully requested. Pursuant to the provisions of M.P.E.P. § 609, it is requested that the Examiner return a copy of the attached Form 1449, marked as being considered and initialed by the Examiner, to the undersigned with the next official communication.

I. Compliance with 37 C.F.R. § 1.97 **A. 1.97(b)**

i. This statement is submitted within three months of the filing date of the above-identified application, which is not an application under 37 C.F.R. § 1.53(d).

ii. This statement is submitted before the mailing date of a first Office Action on-the-merits.

iii. This statement is submitted before the mailing of a first Office Action after the filing of a Request for Continued Examination under 37 C.F.R. § 1.114 or a CPA under 37 C.F.R. § 1.53(d).

iv. No Fee or Certification is due for consideration of the items listed on the enclosed Form 1449.

B. **1.97(c)**

i. This statement is submitted after the mailing date of a first Office Action on-the-merits or a first Office Action after filing a Request for Continued Examination under 37 C.F.R. § 1.114 or a CPA under 37 C.F.R. § 1.53(d), but before the mailing date of: i) a final action under 37 C.F.R. § 1.113; ii) a Notice of Allowance under 37 C.F.R. § 1.311; or iii) an action that otherwise closes prosecution on the application.

a. Enclosed is a credit card authorization in the amount of \$180.00 under 37 C.F.R. § 1.17(p) for consideration of the items listed on the enclosed Form 1449.

b. No fee is required for consideration of the items listed on the enclosed Form 1449.

1. Certification Under 37 C.F.R. §1.97(e)(1) or 1.97(e)(2) is provided.

C. **1.97(d)**

i. This statement is submitted after the mailing date of a final action under 37 C.F.R. § 1.113 or after the mailing date of the Notice of Allowance under 37 C.F.R. § 1.311 or after any other action that closes prosecution on the application, but before the payment of the issue fee. This statement is submitted as certified below under 37 C.F.R. §1.97(e)(1) or (2) by the undersigned.

a. Enclosed is a credit card authorization in the amount of \$180.00 under 37 C.F.R. § 1.17(p) for consideration of the items listed on the enclosed Form 1449.

1. Certification Under 37 C.F.R. §1.97(e)(1) or 1.97(e)(2) is provided.

II. Certification Under 37 C.F.R. §1.97(e)(1) or 1.97(e)(2)

A. Certification Under 37 C.F.R. §1.97(e)(1): In accordance with 37 C.F.R. §1.97(c) or §1.97(d), the undersigned hereby certifies that each item of information listed on the enclosed Form 1449 was first cited in a communication from a foreign patent office in a counterpart foreign application within three months of filing this statement.

B. Certification Under 37 C.F.R. §1.97(e)(2): In accordance with 37 C.F.R. §1.97(c) or §1.97(d), the undersigned hereby certifies that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in §1.56(c) more than three months prior to the filing of the information disclosure statement.

III. Compliance with 37 C.F.R. 1.98

A. In accordance with 37 C.F.R. §1.98(d), copies of any U.S. Patents and U.S. patent publications listed on the enclosed Form 1449 are not provided.

B. In accordance with 37 C.F.R. §1.98(a)(2), a copy of any foreign patent document or "Other Document" listed on the Form 1449 is enclosed.

C. In accordance with 37 C.F.R. §1.98(d)(1) and 1.98(d)(2), documents listed on the Form 1449 for which copies are required under 37 C.F.R. §1.98(a), but are currently not provided, have been previously submitted in earlier U.S. Application No. _____ for which the above-identified application relies on the earlier effective filing date under 35 U.S.C. §120. A copy of any "Other Document" listed on the Form 1449 not previously provided in the earlier application is enclosed in accordance with 37 C.F.R. §1.98(a)(2).

D. In accordance with 37 C.F.R. §1.98(a)(3)(i), a concise explanation of the relevance of each Reference, namely reference _____, that is not in the English language is provided: _____.

IV. Other

No representation is made that a reference is "prior art" within the meaning of 35 U.S.C. §§ 102 and 103 and pursuant to 37 C.F.R. § 1.131 or otherwise, the right to establish that the reference(s) are not "prior art" is reserved. Moreover, no representation is made that a reference has been thoroughly reviewed or that any relevance of any portion of a reference is intended.

Please charge any additional fees or credit any overpayment to Deposit Account No. 50-3634.

Respectfully submitted,

HOPE BALDAUFF, LLC

/Donald J. Lecher/

Donald J. Lecher
Reg. No. 41,933

Date: September 19, 2014

HOPE BALDAUFF, LLC
100 Colony Square
1175 Peachtree Street, N.E.
Suite 2000
Atlanta, Georgia 30361
404.815.1900



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.

Substitute for form 1449/PTO			Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT			Application Number	13/875,749
			Filing Date	May 2, 2013
			First Named Inventor	Timothy A. Murphy
			Art Unit	3646
			Examiner Name	Not Yet Assigned
(Use as many sheets as necessary)			Attorney Docket Number	12-1366/60055.0205US01
Sheet	1	of	1	

U.S. Patent Documents						
Examiner Initials*	Cite No. ¹	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	
		Number-Kind Code ₂ (if known)				
		2011/0163908	07/07/2011	Andersson, et al.		
		2007/0109190	05/17/2007	Smith		
		2012/0223811	09/06/2012	Wild, et al.		
		2012/0299763	11/29/2012	Ryan, et al.		
Foreign Patent Documents						
Examiner Initials*	Cite No. ¹	Foreign Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ₆
		Country Code ₃ - Number ₄ - Kind Code ₅ (if known)				

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹		T ₂
		Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	
		Extended European Search Report from European Application No. 14160782.0 dated September 2, 2014.	

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. 1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. 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 2 hours 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, 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 (1-800-786-9199) and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	20185238
Application Number:	13875749
International Application Number:	
Confirmation Number:	6872
Title of Invention:	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation
First Named Inventor/Applicant Name:	Timothy Allen Murphy
Customer Number:	75741
Filer:	Donald Jefferson Lecher
Filer Authorized By:	
Attorney Docket Number:	12-1366 / 60055.0205US01
Receipt Date:	19-SEP-2014
Filing Date:	02-MAY-2013
Time Stamp:	09:55:17
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	Miscellaneous Incoming Letter	12-1366_Transmittal_for_IDS. pdf	138960 <small>0992afb879d3696e3b235294862d277776 ffa65</small>	no	1

Warnings:

Information:

2	Transmittal Letter	12-1366_IDS_Cover_Letter_9-19-14.pdf	138918 90182b9f1bd858523cba0af4857cec351fae2625	no	3
Warnings:					
Information:					
3	Miscellaneous Incoming Letter	12-1366_IDS_1449.pdf	277753 9766cb0698383b86c0be96986d83ab8a678b415f	no	1
Warnings:					
Information:					
4	Non Patent Literature	European_Search_Report.pdf	781813 859fe3760ace87ffa2b585026e6e05b3eb3f1c05	no	7
Warnings:					
Information:					
Total Files Size (in bytes):				1337444	

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.



UNITED STATES PATENT AND TRADEMARK OFFICE

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

Table with 4 columns: APPLICATION NUMBER (13/875,749), FILING OR 371(C) DATE (05/02/2013), FIRST NAMED APPLICANT (Timothy Allen Murphy), ATTY. DOCKET NO./TITLE (12-1366 / 60055.0205US01)

CONFIRMATION NO. 6872

NEW OR REVISED PPD NOTICE



75741
Hope Baldauff, LLC
100 Colony Square
1175 Peachtree Street, N.E., Suite 2000
Atlanta, GA 30361

NOTICE OF NEW OR REVISED PROJECTED PUBLICATION DATE

The above-identified application has a new or revised projected publication date. The current projected publication date for this application is 11/06/2014. If this is a new projected publication date (there was no previous projected publication date), the application has been cleared by Licensing & Review or a secrecy order has been rescinded and the application is now in the publication queue.

If this is a revised projected publication date (one that is different from a previously communicated projected publication date), the publication date has been revised due to processing delays in the USPTO or the abandonment and subsequent revival of an application. The application is anticipated to be published on a date that is more than six weeks different from the originally-projected publication date.

More detailed publication information is available through the private side of Patent Application Information Retrieval (PAIR) System. The direct link to access PAIR is currently http://pair.uspto.gov. Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Questions relating to this Notice should be directed to the Office of Data Management, Application Assistance Unit at (571) 272-4000, or (571) 272-4200, or 1-888-786-0101.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/875,749, 05/02/2013, 3646, 2020, 12-1366 / 60055.0205US01, 20, 4

CONFIRMATION NO. 6872

CORRECTED FILING RECEIPT



75741
Hope Baldauff, LLC
100 Colony Square
1175 Peachtree Street, N.E., Suite 2000
Atlanta, GA 30361

Date Mailed: 01/31/2014

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)

Timothy Allen Murphy, Everett, WA;
William Matthew Harris, Seattle, WA;

Applicant(s)

The Boeing Company, Chicago, IL

Assignment For Published Patent Application

The Boeing Company, Chicago, IL

Power of Attorney: The patent practitioners associated with Customer Number 75741

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

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 - A proper Authorization to Permit Access to Application by Participating Offices (PTO/SB/39 or its equivalent) has been received by the USPTO.

Projected Publication Date: To Be Determined - pending completion of Security Review

Non-Publication Request: No

Early Publication Request: No

Title

Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation

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

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.



UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 4 columns: APPLICATION NUMBER (13/875,749), FILING OR 371(C) DATE (05/02/2013), FIRST NAMED APPLICANT (Timothy Allen Murphy), ATTY. DOCKET NO./TITLE (12-1366 / 60055.0205US01)

CONFIRMATION NO. 6872

NONPUBLICATION RESCISSION LETTER



75741
Hope Baldauff, LLC
100 Colony Square
1175 Peachtree Street, N.E., Suite 2000
Atlanta, GA 30361

Date Mailed: 01/31/2014

Communication Regarding Rescission Of Nonpublication Request and/or Notice of Foreign Filing

Applicant's rescission of the previously-filed nonpublication request and/or notice of foreign filing is acknowledged. The paper has been reflected in the Patent and Trademark Office's (USPTO's) computer records so that the earliest possible projected publication date can be assigned.

The projected publication date is to be determined pending completion of Security Review..

If applicant rescinded the nonpublication request before or on the date of "foreign filing,"1 then no notice of foreign filing is required.

If applicant foreign filed the application after filing the above application and before filing the rescission, and the rescission did not also include a notice of foreign filing, then a notice of foreign filing (not merely a rescission) is required to be filed within 45 days of the date of foreign filing. See 35 U.S.C. § 122(b)(2)(B)(iii), and Clarification of the United States Patent and Trademark Office's Interpretation of the Provisions of 35 U.S.C. § 122(b)(2)(B)(ii)-(iv), 1272 Off. Gaz. Pat. Office 22 (July 1, 2003).

If a notice of foreign filing is required and is not filed within 45 days of the date of foreign filing, then the application becomes abandoned pursuant to 35 U.S.C. § 122(b)(2)(B)(iii). In this situation, applicant should either file a petition to revive or notify the Office that the application is abandoned. See 37 CFR 1.137(f). Any such petition to revive will be forwarded to the Office of Petitions for a decision. Note that the filing of the petition will not operate to stay any period of reply that may be running against the application.

Questions regarding petitions to revive should be directed to the Office of Petitions at (571) 272-3282.

1 Note, for purpose of this notice, that "foreign filing" means "filing an application directed to the same invention in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing".

/ttran/

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

AUTHORIZATION TO PERMIT ACCESS TO APPLICATION BY PARTICIPATING OFFICES

COMPLETE IF KNOWN

Application Number	13/875749
Filing Date	May 2, 2013
First Named Inventor	Timothy Allen Murphy
Attorney Docket Number	12-1366/60055.0205US01
Title (Required)	Device, System and Methods using Angle of Arrival Measurements for ADS-B Authentication and Navigation

Send completed form to: Commissioner for Patents
P.O. Box 1450, Alexandria, VA 22313-1450

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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h).

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the above-identified application with respect to: 1) the above-identified patent application-as-filed; 2) any foreign application to which the above-identified patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application; and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

This written authorization should be submitted prior to the filing of a subsequent foreign application, in which priority is claimed to the above-identified patent application, with any intellectual property office (e.g., the EPO, JPO, KIPO, or DAS Accessing Office). However, if applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified patent application is filed to have access to the above-identified patent application, this written authorization should not be filed.

No fee will be charged under 37 CFR 1.19(b)(1) for providing a participating intellectual property office with an electronic copy of the above-identified patent application.

This form must be signed by an authorized party in accordance with 37 CFR 1.14(c).

/James M. Poole/

Signature

January 27, 2014

Date

James M. Poole

Printed or Typed Name

562-797-9014

Telephone Number

Patent Portfolio Manager

Title

45,311

Registration Number, if applicable

This collection of information is required by 37 CFR 1.14(h). 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 6 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.

Privacy Act Statement

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

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

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

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: The Boeing Company

Application No./Patent No.: 13/875749 Filed/Issue Date: May 2, 2013

Titled: Device, System and Methods using Angle of Arrival Measurements for ADS-B Authentication and Navigation

The Boeing Company, 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 030391, Frame 0964, 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.

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)

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.

/James M. Poole/

Signature

James M. Poole

Printed or Typed Name

January 27, 2014

Date

45,311

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.

Electronic Acknowledgement Receipt

EFS ID:	18034401
Application Number:	13875749
International Application Number:	
Confirmation Number:	6872
Title of Invention:	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation
First Named Inventor/Applicant Name:	Timothy Allen Murphy
Customer Number:	75741
Filer:	Clifford G. Cousins/Mary Champion
Filer Authorized By:	Clifford G. Cousins
Attorney Docket Number:	12-1366 / 60055.0205US01
Receipt Date:	27-JAN-2014
Filing Date:	02-MAY-2013
Time Stamp:	15:54:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Rescind Nonpublication Request for Pre Grant Pub	12-1366_SB36.pdf	260128 <small>74f8db0f079ca77560b81036575e3be0f4cb0a3e</small>	no	2

Warnings:

Information:

2	Authorization to access Appl. by Trilateral Office	12-1366_SB39.pdf	80890	no	2
			a7b3c5ec17833151ff2bf963c7a82647994e3982		
Warnings:					
Information:					
3	PTO/SB/69-Authorize EPO Access to Search Results	12-1366_SB69.pdf	152667	no	2
			c8b99c9934921b8cb7989cb0cc44ed8fd259b90d		
Warnings:					
Information:					
4	Miscellaneous Incoming Letter	12-1366_AIA96.pdf	118108	no	3
			d19ca8c48b36f8e8b4cb4579ff898bdfaf56e8f59		
Warnings:					
Information:					
Total Files Size (in bytes):			611793		

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.

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.

RESCISSION OF PREVIOUS NONPUBLICATION REQUEST (35 U.S.C. 122(b)(2)(B)(ii)) AND, IF APPLICABLE, NOTICE OF FOREIGN FILING (35 U.S.C. 122(b)(2)(B)(iii))	Application Number		13/875749
	Filing Date		May 2, 2013
	First Named Inventor		Timothy Allen Murphy
	Title	Device, System and Methods Using Angle of A	
	Atty Docket Number		12-1366/60055.0205US01
	Art Unit		3646
	Examiner		Unknown

Send completed form to:
Mail Stop PG Pub
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, VA 22313-1450
 FAX: (571) 273-8300

A request that the above-identified application not be published under 35 U.S.C. 122(b) (nonpublication request) was included with the above-identified application on filing pursuant to 35 U.S.C. 122(b)(2)(B)(i). I hereby **rescind** the previous nonpublication request.

If a notice of foreign or international filing is or will be required by 35 U.S.C. 122(b)(2)(B)(iii) and 37 CFR 1.213(c), I hereby provide such notice. This notice is being provided no later than forty-five (**45**) days after the date of such foreign or international filing.

*If a notice of subsequent foreign or international filing required by 35 U.S.C. 122(b)(2)(B)(iii) and 37 CFR 1.213(c) was not filed within forty-five (**45**) days after the date of filing of the foreign or international application, the application is ABANDONED, and a petition to revive under 37 CFR 1.137(b) is required. See 37 CFR 1.137(f).*

/James M. Poole/

January 27, 2014

Signature

Date

James M. Poole

45,311

Typed or printed name

Registration Number, if applicable

562-797-9014

Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b).

If information or assistance is needed in completing this form, please contact the Pre-Grant Publication Division at (703)605-4283 or by e-mail at PGPub@USPTO.gov.

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop PG Pub, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or facsimile transmitted to the U.S. Patent and Trademark Office on the date shown below.

Signature via e-filing

Name (Print/Type)

Date

This collection of information is required by 37 CFR 1.213(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 6 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: Mail Stop PG Pub, 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.

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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
13/875,749

APPLICATION AS FILED - PART I

(Column 1) (Column 2)

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A
TOTAL CLAIMS (37 CFR 1.16(j))	20	minus 20 = *
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	minus 3 = * 1
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))		

SMALL ENTITY

RATE(\$)	FEE(\$)
N/A	
N/A	
N/A	
TOTAL	

OR OTHER THAN SMALL ENTITY

RATE(\$)	FEE(\$)
N/A	280
N/A	600
N/A	720
x 80 =	0.00
x 420 =	420
	0.00
	0.00
TOTAL	2020

* 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)

AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
Independent (37 CFR 1.16(h))	*	Minus	***	=	
Application Size Fee (37 CFR 1.16(s))					
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

SMALL ENTITY

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

OR OTHER THAN SMALL ENTITY

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

(Column 1) (Column 2) (Column 3)

AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total (37 CFR 1.16(i))	*	Minus	**	=
Independent (37 CFR 1.16(h))	*	Minus	***	=	
Application Size Fee (37 CFR 1.16(s))					
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					

SMALL ENTITY

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

OR OTHER THAN SMALL ENTITY

RATE(\$)	ADDITIONAL FEE(\$)
x =	
x =	
TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.



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

Table with 7 columns: APPLICATION NUMBER, FILING or 371(c) DATE, GRP ART UNIT, FIL FEE REC'D, ATTY. DOCKET NO, TOT CLAIMS, IND CLAIMS. Row 1: 13/875,749, 05/02/2013, 3646, 2020, 12-1366 / 60055.0205US01, 20, 4

CONFIRMATION NO. 6872

FILING RECEIPT



75741
Hope Baldauff, LLC
1720 Peachtree Street, N.W.
Suite 1010
Atlanta, GA 30309

Date Mailed: 06/10/2013

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)

Timothy Allen Murphy, Everett, WA;
William Matthew Harris, Seattle, WA;

Applicant(s)

The Boeing Company, Chicago, IL

Assignment For Published Patent Application

The Boeing Company, Chicago, IL

Power of Attorney: The patent practitioners associated with Customer Number 75741

Domestic Applications for which benefit is claimed - None.

A proper domestic benefit claim must be provided in an Application Data Sheet in order to constitute a claim for domestic benefit. See 37 CFR 1.76 and 1.78.

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.

Projected Publication Date: Request for Non-Publication Acknowledged

Non-Publication Request: Yes

Early Publication Request: No

Title

Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation

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 (1-866-999-4158).

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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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

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UNITED STATES DEPARTMENT OF COMMERCE
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/875,749	05/02/2013	Timothy Allen Murphy	12-1366 / 60055.0205US01

CONFIRMATION NO. 6872

POA ACCEPTANCE LETTER



75741
Hope Baldauff, LLC
1720 Peachtree Street, N.W.
Suite 1010
Atlanta, GA 30309

Date Mailed: 06/10/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 05/02/2013.

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

/khoang/

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

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

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	12-1366 / 60055.0205US01
	First Named Inventor	Timothy Allen Murphy
	Title	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authent
	Express Mail Label No.	Via EFS

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
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<p>1. <input checked="" type="checkbox"/> Fee Transmittal Form (PTO/SB/17 or equivalent)</p> <p>2. <input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27</p> <p>3. <input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.</p> <p>4. <input checked="" type="checkbox"/> Specification [Total Pages <u>29</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement)</p> <p>5. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets <u>8</u>]</p> <p>6. Inventor's Oath or Declaration [Total Pages <u>2</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))</p> <p>a. <input checked="" type="checkbox"/> Newly executed (original or copy)</p> <p>b. <input type="checkbox"/> A copy from a prior application (37 CFR 1.63(d))</p> <p>7. <input checked="" type="checkbox"/> Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent)</p> <p>8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix)</p> <p><input type="checkbox"/> Landscape Table on CD</p> <p>9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required)</p> <p>a. <input type="checkbox"/> Computer Readable Form (CRF)</p> <p>b. <input type="checkbox"/> Specification Sequence Listing on:</p> <p>i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or</p> <p>ii. <input type="checkbox"/> Paper</p> <p>c. <input type="checkbox"/> Statements verifying identity of above copies</p>	<p style="text-align: center;">ACCOMPANYING APPLICATION PAPERS</p> <p>10. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) Name of Assignee _____</p> <p>11. <input type="checkbox"/> 37 CFR 3.73(c) Statement <input checked="" type="checkbox"/> Power of Attorney (when there is an assignee)</p> <p>12. <input type="checkbox"/> English Translation Document (if applicable)</p> <p>13. <input checked="" type="checkbox"/> Information Disclosure Statement (PTO/SB/08 or PTO-1449) <input type="checkbox"/> Copies of citations attached</p> <p>14. <input type="checkbox"/> Preliminary Amendment</p> <p>15. <input type="checkbox"/> Return Receipt Postcard (MPEP § 503) (Should be specifically itemized)</p> <p>16. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed)</p> <p>17. <input checked="" type="checkbox"/> Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.</p> <p>18. <input type="checkbox"/> Other: _____ _____ _____ _____</p>
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***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

The address associated with Customer Number: 75741 OR Correspondence address below

Name			
Address			
City	State	Zip Code	
Country	Telephone	Email	

Signature	/Donald J. Lecher/	Date	May 2, 2013
Name (Print/Type)	Donald J. Lecher	Registration No. (Attorney/Agent)	41,933

This collection of information is required by 37 CFR 1.53(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.

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.

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

FEE TRANSMITTAL		Complete if known	
		Application Number	Not Yet Assigned
<input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27.	Filing Date	Even Date Herewith	
<input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.	First Named Inventor	Timothy Allen Murphy	
TOTAL AMOUNT OF PAYMENT	Examiner Name		
	Art Unit		
(S) 2020	Practitioner Docket No.	12-1366 / 60055.0205US01	

METHOD OF PAYMENT (check all that apply)
 Check Credit Card Money Order None Other (please identify): _____

 Deposit Account Deposit Account Number: 50-3634 Deposit Account Name: HBH

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

 Charge fee(s) indicated below Charge fee(s) indicated below, **except for the filing fee**
 Charge any additional fee(s) or underpayment of fee(s) Credit any overpayment of fee(s) under 37 CFR 1.16 and 1.17
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)**

Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	280	140*	70	600	300	150	720	360	180	1600
Design	180	90	45	120	60	30	460	230	115	
Plant	180	90	45	380	190	95	580	290	145	
Reissue	280	140	70	600	300	150	2,160	1,080	540	
Provisional	260	130	65	0	0	0	0	0	0	

* The \$140 small entity status filing fee for a utility application is further reduced to \$70 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	80	40	20
Each independent claim over 3 (including Reissues)	420	210	105
Multiple dependent claims	780	390	195
Total Claims			
20 _____ -20 or HP = 0 _____ x 80 _____ = 0 _____			
HP = highest number of total claims paid for, if greater than 20.			
Indep. Claims			
4 _____ -3 or HP = 1 _____ x 420 _____ = 420 _____			
HP = highest number of independent claims paid for, if greater than 3.			

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$400 (\$200 for small entity) (\$100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
40 _____ - 100 = 0 _____ / 50 = 0 _____ (round up to a whole number) x 400 _____ = _____				

4. OTHER FEE(S)

Non-English specification, \$130 fee (no small or micro entity discount)

Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)

Other (e.g., late filing surcharge): _____

SUBMITTED BY			
Signature	/Donald J. Lecher/	Registration No. (Attorney/Agent) 41,933	Telephone 404-815-1900
Name (Print/Type)	Donald J. Lecher		Date May 2, 2013

This collection of information is required by 37 CFR 1.136. 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, 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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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.

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

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	12-1366 / 60055.0205US01
	First Named Inventor	Timothy Allen Murphy
	Title	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authent
	Express Mail Label No.	Via EFS

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
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<p>1. <input checked="" type="checkbox"/> Fee Transmittal Form (PTO/SB/17 or equivalent)</p> <p>2. <input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27</p> <p>3. <input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.</p> <p>4. <input checked="" type="checkbox"/> Specification [Total Pages <u>29</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement)</p> <p>5. <input checked="" type="checkbox"/> Drawing(s) (35 U.S.C. 113) [Total Sheets <u>8</u>]</p> <p>6. Inventor's Oath or Declaration [Total Pages <u>2</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))</p> <p>a. <input checked="" type="checkbox"/> Newly executed (original or copy)</p> <p>b. <input type="checkbox"/> A copy from a prior application (37 CFR 1.63(d))</p> <p>7. <input checked="" type="checkbox"/> Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent)</p> <p>8. CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix)</p> <p><input type="checkbox"/> Landscape Table on CD</p> <p>9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required)</p> <p>a. <input type="checkbox"/> Computer Readable Form (CRF)</p> <p>b. <input type="checkbox"/> Specification Sequence Listing on:</p> <p>i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or</p> <p>ii. <input type="checkbox"/> Paper</p> <p>c. <input type="checkbox"/> Statements verifying identity of above copies</p>	<p style="text-align: center;">ACCOMPANYING APPLICATION PAPERS</p> <p>10. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) Name of Assignee _____</p> <p>11. <input type="checkbox"/> 37 CFR 3.73(c) Statement <input checked="" type="checkbox"/> Power of Attorney (when there is an assignee)</p> <p>12. <input type="checkbox"/> English Translation Document (if applicable)</p> <p>13. <input checked="" type="checkbox"/> Information Disclosure Statement (PTO/SB/08 or PTO-1449) <input type="checkbox"/> Copies of citations attached</p> <p>14. <input type="checkbox"/> Preliminary Amendment</p> <p>15. <input type="checkbox"/> Return Receipt Postcard (MPEP § 503) (Should be specifically itemized)</p> <p>16. <input type="checkbox"/> Certified Copy of Priority Document(s) (if foreign priority is claimed)</p> <p>17. <input checked="" type="checkbox"/> Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.</p> <p>18. <input type="checkbox"/> Other: _____ _____ _____ _____</p>
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***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS				
<input checked="" type="checkbox"/> The address associated with Customer Number: <u>75741</u> OR <input type="checkbox"/> Correspondence address below				
Name				
Address				
City	State	Zip Code		
Country	Telephone	Email		

Signature	/Donald J. Lecher/	Date	May 2, 2013
Name (Print/Type)	Donald J. Lecher	Registration No. (Attorney/Agent)	41,933

This collection of information is required by 37 CFR 1.53(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.**

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FEE TRANSMITTAL		Complete if known	
		Application Number	Not Yet Assigned
<input type="checkbox"/> Applicant asserts small entity status. See 37 CFR 1.27.	Filing Date	Even Date Herewith	
<input type="checkbox"/> Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.	First Named Inventor	Timothy Allen Murphy	
TOTAL AMOUNT OF PAYMENT	Examiner Name		
	Art Unit		
(S) 2020	Practitioner Docket No.	12-1366 / 60055.0205US01	

METHOD OF PAYMENT (check all that apply)
 Check Credit Card Money Order None Other (please identify): _____

 Deposit Account Deposit Account Number: 50-3634 Deposit Account Name: HBH

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

 Charge fee(s) indicated below Charge fee(s) indicated below, **except for the filing fee**
 Charge any additional fee(s) or underpayment of fee(s) Credit any overpayment of fee(s) under 37 CFR 1.16 and 1.17

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION**1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)**

Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	280	140*	70	600	300	150	720	360	180	1600
Design	180	90	45	120	60	30	460	230	115	
Plant	180	90	45	380	190	95	580	290	145	
Reissue	280	140	70	600	300	150	2,160	1,080	540	
Provisional	260	130	65	0	0	0	0	0	0	

* The \$140 small entity status filing fee for a utility application is further reduced to \$70 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	80	40	20
Each independent claim over 3 (including Reissues)	420	210	105
Multiple dependent claims	780	390	195
Total Claims			
20 _____ -20 or HP = 0 _____ x 80 _____ = 0 _____			
HP = highest number of total claims paid for, if greater than 20.			
Indep. Claims			
4 _____ -3 or HP = 1 _____ x 420 _____ = 420 _____			
HP = highest number of independent claims paid for, if greater than 3.			

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$400 (\$200 for small entity) (\$100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
40 _____ - 100 = 0 _____ / 50 = 0 _____ (round up to a whole number) x 400 _____ = _____				

4. OTHER FEE(S)

Non-English specification, \$130 fee (no small or micro entity discount)

Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)

Other (e.g., late filing surcharge): _____

SUBMITTED BY			
Signature	/Donald J. Lecher/	Registration No. (Attorney/Agent) 41,933	Telephone 404-815-1900
Name (Print/Type)	Donald J. Lecher		Date May 2, 2013

This collection of information is required by 37 CFR 1.136. 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, 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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NONPUBLICATION REQUEST UNDER 35 U.S.C. 122(b)(2)(B)(i)	First Named Inventor	Timothy Allen Murphy
	Title	DEVICE, SYSTEM AND METHODS USING ANC
	Attorney Docket Number	12-1366 / 60055.0205US01

I hereby 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.

I hereby request that the attached application not be published under 35 U.S.C. 122(b).

/Donald J. Lecher/

May 2, 2013

Signature_____
Date

Donald J. Lecher

41,933

Typed or printed name_____
Registration Number, if applicable

(404) 815-1900

Telephone Number

This request must be signed in compliance with 37 CFR 1.33(b) and submitted with the application **upon filing**.

Applicant may rescind this nonpublication request at any time. If applicant rescinds a request that an application not be published under 35 U.S.C. 122(b), the application will be scheduled for publication at eighteen months from the earliest claimed filing date for which a benefit is claimed.

If applicant subsequently files an application directed to the invention disclosed in the attached application in another country, or under a multilateral international agreement, that requires publication of applications eighteen months after filing, the applicant **must** notify the United States Patent and Trademark Office of such filing within forty-five (45) days after the date of the filing of such foreign or international application. **Failure to do so will result in abandonment of this application (35 U.S.C. 122(b)(2)(B)(iii)).**

This collection of information is required by 37 CFR 1.213(a). 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 6 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 (1-800-786-9199) and select option 2.

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.

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.

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B or equivalent) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5. If the Power of Attorney by Applicant form is not accompanied by this transmittal form or an equivalent, the Power of Attorney will not be recognized in the application.

Application Number	Not Yet Assigned
Filing Date	Even Date Herewith
First Named Inventor	Timothy Allen Murphy
Title	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation
Art Unit	
Examiner Name	
Attorney Docket Number	12-1366 / 60055.0205US01

SIGNATURE of Applicant or Patent Practitioner

Signature	/Donald J. Lecher/	Date	May 2, 2013
Name	Donald J. Lecher	Telephone	(404) 815-1900
Registration Number	41,933		

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

*Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. 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 3 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.

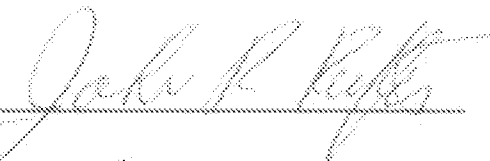
POWER OF ATTORNEY FOR CUSTOMER NUMBER FROM ASSIGNEE TO
PROSECUTE APPLICATIONS BEFORE THE USPTO

The Assignee, The Boeing Company, hereby appoint all Practitioners associated with Customer Number 75741 to serve as attorney(s) or agent(s) representing The Boeing Company before the United States Patent and Trademark Office (USPTO) in any and all patents and patent applications that i) are associated with this Customer Number and ii) are assigned to The Boeing Company according to the USPTO assignment records.

SIGNATURE of Assignee of Record: The individual whose signature and title is supplied below is authorized to act in this matter on behalf of The Boeing Company.

Assignee Name and Address:

The Boeing Company	(mailing address)
100 North Riverside Plaza	P.O. Box 2515 MC 110-SD54
Chicago, Illinois 60606-2016	Seal Beach, CA 90740 -2515, USA

Signature  Date: 1 October 2012
Name: John R. Rafter Telephone: 562 797 9012
Title: Assistant Secretary, The Boeing Company

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

Title of
Invention

DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS
FOR ADS-B AUTHENTICATION AND NAVIGATION

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 identify them. 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: Timothy Allen Murphy

Date (Optional): 4/30/13

Signature: Timothy Allen Murphy

Note: An application data sheet (PTOIAIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SSB/AIA01 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 1480, Alexandria, VA 22315-1480. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1480, Alexandria, VA 22315-1480.

If you need assistance in completing this form, call 1-800-PTO-9198 and select option 2.

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

Title of
Invention

DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS
FOR ADS-B AUTHENTICATION AND NAVIGATION

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:

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LEGAL NAME OF INVENTOR

Inventor: William Matthew Harris

Date (Optional):

4/30/2013

Signature:

William M. Harris

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/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 1480, 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 this 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	12-1366 / 60055.0205US01
		Application Number	
Title of Invention	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation		
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

<input type="checkbox"/> 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					<input type="button" value="Remove"/>
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	Timothy	Allen	Murphy		
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
City	Everett	State/Province	WA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	P.O. Box 3707				
Address 2					
City	Seattle	State/Province	WA		
Postal Code	98124	Country i	US		

Inventor 2					<input type="button" value="Remove"/>
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	William	Matthew	Harris		
Residence Information (Select One) <input checked="" type="radio"/> US Residency <input type="radio"/> Non US Residency <input type="radio"/> Active US Military Service					
City	Seattle	State/Province	WA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	P.O. Box 3707				
Address 2					
City	Seattle	State/Province	WA		
Postal Code	98124	Country i	US		

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.**Correspondence Information:**Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12-1366 / 60055.0205US01
	Application Number	
Title of Invention	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation	

An Address is being provided for the correspondence information of this application.

Customer Number	75741		
Email Address	docketing@hbipfirm.com	<input type="button" value="Add Email"/>	<input type="button" value="Remove Email"/>

Application Information:

Title of the Invention	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation		
Attorney Docket Number	12-1366 / 60055.0205US01	Small Entity Status Claimed	<input type="checkbox"/>
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	1

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:	<input checked="" type="radio"/> Customer Number	<input type="radio"/> US Patent Practitioner	<input type="radio"/> Limited Recognition (37 CFR 11.9)
Customer Number	75741		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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.

Prior Application Status			<input type="button" value="Remove"/>
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			<input type="button" value="Add"/>

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12-1366 / 60055.0205US01
	Application Number	
Title of Invention	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation	

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(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(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)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

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.

Authorization to Permit Access:

Authorization to Permit Access to the Instant Application by the Participating Offices

If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12-1366 / 60055.0205US01
	Application Number	
Title of Invention	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation	

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

Mailing Address Information:

Address 1	100 North Riverside Plaza		
Address 2			
City	Chicago	State/Province	IL
Country ⁱ	US	Postal Code	60606-1596
Phone Number		Fax Number	
Email Address			

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

Non-Applicant Assignee Information:

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	12-1366 / 60055.0205US01
	Application Number	
Title of Invention	Device, System and Methods Using Angle of Arrival Measurements for ADS-B Authentication and Navigation	

Assignee 1				
Complete this section only if non-applicant assignee information is desired to be included on the patent application publication in accordance with 37 CFR 1.215(b). Do not include in this section 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), as the patent application publication will include the name of the applicant(s).				
<input type="button" value="Remove"/>				
If the Assignee is an Organization check here. <input type="checkbox"/>				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee Data may be generated within this form by selecting the Add button. <input type="button" value="Add"/>				

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications				
Signature	/Donald J. Lecher/		Date (YYYY-MM-DD)	2013-05-02
First Name	Donald J.	Last Name	Lecher	Registration Number
				41933
Additional Signature may be generated within this form by selecting the Add button. <input type="button" value="Add"/>				

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

Privacy Act Statement

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Murphy et al. Examiner:
Serial No.: Not Yet Assigned Group Art Unit:
Filed: Even Date Herewith Docket No.: 12-1366 / 60055.0205US01
Title: Device, System and Methods Using Angle of Arrival Measurements for ADS-B
 Authentication and Navigation

INFORMATION DISCLOSURE STATEMENT (37 C.F.R. § 1.97)

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

Dear Sir:

With regard to the above-identified application, the items of information listed on the enclosed Form 1449 are brought to the attention of the Examiner.

Consideration of the items listed is respectfully requested. Pursuant to the provisions of M.P.E.P. § 609, it is requested that the Examiner return a copy of the attached Form 1449, marked as being considered and initialed by the Examiner, to the undersigned with the next official communication.

I. Compliance with 37 C.F.R. § 1.97 **A. 1.97(b)**

i. This statement is submitted within three months of the filing date of the above-identified application, which is not an application under 37 C.F.R. § 1.53(d).

ii. This statement is submitted before the mailing date of a first Office Action on-the-merits.

iii. This statement is submitted before the mailing of a first Office Action after the filing of a Request for Continued Examination under 37 C.F.R. § 1.114 or a CPA under 37 C.F.R. § 1.53(d).

iv. No Fee or Certification is due for consideration of the items listed on the enclosed Form 1449.

B. **1.97(c)**

i. This statement is submitted after the mailing date of a first Office Action on-the-merits or a first Office Action after filing a Request for Continued Examination under 37 C.F.R. § 1.114 or a CPA under 37 C.F.R. § 1.53(d), but before the mailing date of: i) a final action under 37 C.F.R. § 1.113; ii) a Notice of Allowance under 37 C.F.R. § 1.311; or iii) an action that otherwise closes prosecution on the application.

a. Enclosed is a credit card authorization in the amount of \$180.00 under 37 C.F.R. § 1.17(p) for consideration of the items listed on the enclosed Form 1449.

b. No fee is required for consideration of the items listed on the enclosed Form 1449.

1. Certification Under 37 C.F.R. §1.97(e)(1) or 1.97(e)(2) is provided.

C. **1.97(d)**

i. This statement is submitted after the mailing date of a final action under 37 C.F.R. § 1.113 or after the mailing date of the Notice of Allowance under 37 C.F.R. § 1.311 or after any other action that closes prosecution on the application, but before the payment of the issue fee. This statement is submitted as certified below under 37 C.F.R. §1.97(e)(1) or (2) by the undersigned.

a. Enclosed is a credit card authorization in the amount of \$180.00 under 37 C.F.R. § 1.17(p) for consideration of the items listed on the enclosed Form 1449.

1. Certification Under 37 C.F.R. §1.97(e)(1) or 1.97(e)(2) is provided.

II. Certification Under 37 C.F.R. §1.97(e)(1) or 1.97(e)(2)

A. Certification Under 37 C.F.R. §1.97(e)(1): In accordance with 37 C.F.R. §1.97(c) or §1.97(d), the undersigned hereby certifies that each item of information listed on the enclosed Form 1449 was first cited in a communication from a foreign patent office in a counterpart foreign application within three months of filing this statement.

B. Certification Under 37 C.F.R. §1.97(e)(2): In accordance with 37 C.F.R. §1.97(c) or §1.97(d), the undersigned hereby certifies that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in §1.56(c) more than three months prior to the filing of the information disclosure statement.

III. Compliance with 37 C.F.R. 1.98

A. In accordance with 37 C.F.R. §1.98(d), copies of any U.S. Patents and U.S. patent publications listed on the enclosed Form 1449 are not provided.

B. In accordance with 37 C.F.R. §1.98(a)(2), a copy of any foreign patent document or "Other Document" listed on the Form 1449 is enclosed.

C. In accordance with 37 C.F.R. §1.98(d)(1) and 1.98(d)(2), documents listed on the Form 1449 for which copies are required under 37 C.F.R. §1.98(a), but are currently not provided, have been previously submitted in earlier U.S. Application No. _____ for which the above-identified application relies on the earlier effective filing date under 35 U.S.C. §120. A copy of any "Other Document" listed on the Form 1449 not previously provided in the earlier application is enclosed in accordance with 37 C.F.R. §1.98(a)(2).

D. In accordance with 37 C.F.R. §1.98(a)(3)(i), a concise explanation of the relevance of each Reference, namely reference _____, that is not in the English language is provided: _____.

IV. Other

No representation is made that a reference is "prior art" within the meaning of 35 U.S.C. §§ 102 and 103 and pursuant to 37 C.F.R. § 1.131 or otherwise, the right to establish that the reference(s) are not "prior art" is reserved. Moreover, no representation is made that a reference has been thoroughly reviewed or that any relevance of any portion of a reference is intended.

Please charge any additional fees or credit any overpayment to Deposit Account No. 50-3634.

Respectfully submitted,

HOPE BALDAUFF, LLC

/Donald J. Lecher/

Donald J. Lecher
Reg. No. 41,933

Date: May 2, 2013

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Atlanta, Georgia 30309
404.815.1900



INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		
	First Named Inventor	Timothy Allen Murphy	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	12-1366 / 60055.0205US01	

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	8169357		2012-05-01	Bruno et al.	
	2	8102301		2012-01-24	Mosher	
	3	8072382		2011-12-06	Smith et al.	
	4	8063816		2011-11-22	Troxel	
	5	8130135		2012-03-06	Donovan	
	6	8004452		2011-08-23	Rolfe et al.	
	7	7383124		2008-06-03	Vesel	
	8	7956795		2011-06-07	Bruno et al.	

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Art Unit		
Examiner Name		
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	9	7570214		2009-08-04	Smith et al.	
	10	7761196		2010-07-20	Brandao et al.	
	11	7880667		2011-02-01	Lanzkron	
	12	7423590		2008-09-09	Smith	
	13	7495612		2009-02-24	Smith	
	14	7730307		2010-06-01	Viggiano et al.	
	15	7414567		2008-08-19	Zhang et al.	
	16	7342514		2008-03-11	Bailey et al.	
	17	6952631		2005-10-04	Griffith et al.	
	18	6681158		2004-01-20	Griffith et al.	
	19	6473003		2002-10-29	Horvath et al.	

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	Art Unit		
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	20	7961136		2011-06-14	Stefani et al.	
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(Not for submission under 37 CFR 1.99)

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First Named Inventor	Timothy Allen Murphy	
Art Unit		
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Attorney Docket Number	12-1366 / 60055.0205US01	

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

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(Not for submission under 37 CFR 1.99)

Application Number		
Filing Date		
First Named Inventor	Timothy Allen Murphy	
Art Unit		
Examiner Name		
Attorney Docket Number	12-1366 / 60055.0205US01	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Donald J. Lecher/	Date (YYYY-MM-DD)	2013-05-02
Name/Print	Donald J. Lecher	Registration Number	41933

This collection of information is required by 37 CFR 1.97 and 1.98. 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 1 hour 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.**

Privacy Act Statement

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

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

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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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.

**DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL
MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION**

TECHNICAL FIELD

[0001] The technical field of the embodiments presented herein is directed toward a time multiplexed antenna array in conjunction with software based receiver technology to enable Angle of Arrival (AOA) measurements of signals of opportunity in the 960-1215MHz band. Use of these AOA measurements allows for authentication of Automatic Dependent Surveillance Broadcast (ADS-B) transmissions from other airplanes thereby making the undetected spoofing of received ADS-B signals difficult. In addition, the use of AOA measurements on signals from a variety of systems already operating in the 960-1215MHz band enables an independent navigation capability which provides an alternative to satellite navigation.

BACKGROUND

[0002] ADS-B is a surveillance technology for tracking aircraft as part of the Next Generation Air Transportation System and will be replacing some ground-based radar systems as the primary surveillance method for controlling aircraft. ADS-B enhances safety by making an aircraft visible, real-time, to Air Traffic Control (ATC) and to other appropriately equipped ADS-B aircraft with position and velocity data transmitted every second. ADS-B also provides the data infrastructure for inexpensive flight tracking, planning, and dispatch.

[0003] ADS-B uses conventional Global Navigation Satellite System (GNSS) technology and a relatively simple broadcast communications data-link (ADS-B unit) as its fundamental components. ADS-B consists of two different services, a transmitted "ADS-B Out" signal and a received "ADS-B In" signal. There are two types of certified ADS-B data links, but the one most commonly used by commercial air transport airplanes operates at 1090 MHz, essentially a modified Mode S transponder. The other ADS-B standard currently in use is known as Universal Access Transceiver (UAT) and operates at 978 MHz. The International Civil Aviation Organization (ICAO) has promulgated standards for both these systems and a third system (so called VHF data link Mode 4) that operates in the VHF frequency band (118-136). The description of the invention herein considers only the ADS-B systems operating in the USA (i.e. Mode-S extended squitter at 1090 MHz and UAT at 978 MHz). However, the general principles can be applied at any frequency band and could be applied to other ADS-B systems such as VDL Mode-4.

[0004] An ADS-B capable aircraft uses an ordinary GNSS (GPS, GLONASS, Galileo, etc.) receiver to derive its precise position from the GNSS constellation and then combines that position with aircraft state information, such as speed, heading, altitude and flight number. This information is then simultaneously broadcast via the "ADS-B Out" signal to other ADS-B capable aircraft and to ADS-B ground, or satellite communications transceivers which then relay the aircraft's position and additional information to ATC centers in real time.

[0005] However, ADS-B includes no provisions for authenticating ADS-B signals received from transmitting sources. Spoofing ADS-B signals is relatively simple and may limit the ultimate usefulness of ADS-B. GNSS jamming devices are widely available and ADS-B spoofing may be done with off-the-shelf equipment. Ground

systems can use multi-lateration or cross check with radar systems to detect bogus ADS-B reports. However, both of these options have significant costs. It is with respect to these and other considerations that the disclosure herein is presented.

SUMMARY

[0006] It should be appreciated that 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 be used to limit the scope of the claimed subject matter.

[0007] In one embodiment disclosed herein, an aircraft receiver for ADS-B verification of a target aircraft includes a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver. The ADS-B flight tracking information includes indicated positional information of the target aircraft. The aircraft receiver further includes a second input for receiving positional information and heading information indicating the location and orientation of a multi-element array antenna configured to be attached to the receiver. The aircraft receiver further includes a processing module that generates a measured bearing derived from angle of arrival data, and an expected bearing of the target aircraft. The expected bearing of the target aircraft is derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation. The processing module further includes a comparator for comparing the expected bearing to the measured bearing and verifies the ADS-B flight tracking information of the target aircraft. The aircraft receiver further includes an output device for outputting an indication of

authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

[0008] In another embodiment disclosed herein, a system for ADS-B verification includes an antenna array assembly having a multiple-element antenna array for receiving ADS-B signals from a target aircraft, where the ADS-B signals include indicated positional data. The system further includes a receiver configured to receive the ADS-B signals from the antenna array assembly and to measure an angle of arrival of the ADS-B signals relative to the orientation of the antenna array assembly. The receiver further includes a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, where the ADS-B flight tracking information includes indicated positional information of the target aircraft. The receiver further includes a second input for receiving positional information and heading information indicating the location and orientation of the receiver. The receiver further includes a processing module generating a measured bearing derived from angle of arrival data, and an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining a location and orientation of a multi-element array antenna configured to be attached to the receiver. The receiver further includes a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft. An output device then outputs an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

[0009] In another embodiment disclosed herein a method of measuring an Angle of Arrival (AOA) includes cycling a commutating solid state switch between each antenna element of a multi-element array antenna based on a synchronization signal

received from an analog-to-digital (A/D) converter of a receiver. The method then proceeds to receive at least one signal at the multi-element array antenna and converts the at least one signal at the A/D converter into a plurality of antenna element specific digital samples for each discrete signal. The method then proceeds to de-multiplex the plurality of antenna element specific digital samples into discrete digital data streams for each antenna element of the multi-element array antenna, and proceeds to determine a measured AOA of the at least one signal based on measuring a relative phase of a carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna.

[0010] The features, functions, and advantages that have been discussed can be achieved independently in various embodiments of the present disclosure or may be combined in yet other embodiments, further details of which can be seen with reference to the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The embodiments presented herein will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0012] FIG. 1 illustrates a schematic component diagram of an antenna array assembly and a receiver according to at least one embodiment disclosed herein,

[0013] FIG. 2 illustrates a schematic diagram of verifying an authentic ADS-B signal according to at least one embodiment disclosed herein;

[0014] FIG. 3 illustrates a schematic diagram of detecting a non-authentic ADS-B signal according to at least one embodiment disclosed herein;

[0015] FIG. 4 illustrates a schematic diagram of a receiver system used to determine an independent position fix according to at least one embodiment disclosed herein;

[0016] FIG. 5 illustrates a logic flowchart for a method according to at least one embodiment disclosed herein;

[0017] FIG. 6 illustrates a continuation of the logic flowchart from FIG. 5 for a method according to at least one embodiment disclosed herein;

[0018] FIG. 7 illustrates a further continuation of the logic flowchart from FIG. 5 for a method according to at least one embodiment disclosed herein; and

[0019] FIG. 8 illustrates a schematic diagram of a ground-based networked receiver system of AOA processors according to at least one embodiment disclosed herein.

DETAILED DESCRIPTION

[0020] The following detailed description is directed to a time multiplexed antenna array used in conjunction with a software based receiver to enable Angle of Arrival (AOA) measurements of signals of opportunity in the 960-1215MHz band. Use of these AOA measurements allows for both the authentication of ADS-B transmissions from other aircraft to detect spoofing of ADS-B signals, and allows for independent navigation using received signals-of-opportunity from a variety of systems already operating in the 960-1215MHz band to provide an alternative to satellite navigation.

[0021] The device and method embodiments presented herein address two issues with ADS-B, the first being that currently ADS-B broadcasts have no built in security or authentication capability. This leaves the system vulnerable to spoofing attacks where a bad actor can broadcast false airplane position reports that may cause false alerts in airborne or ground systems. Ground based systems may include some additional

sensing capability, (e.g., radar or multi-lateration), to address this type of attack. However, such systems are expensive to implement and maintain. Also, no similar airborne alternative exists. The embodiments presented herein provide a means of authenticating an ADS-B signal being broadcast from a transmitter with the correct relative bearing to the position included in the position report.

[0022] The second problem is that air traffic management systems are becoming increasingly dependent on Global Navigation Satellite Systems (GNSS) or Satellite Navigation (SatNav) technologies like Global Positioning Systems (GPS). However, these technologies may be jammed with RF interference and can possibly be spoofed to give erroneous results. The embodiments presented herein enable a completely independent navigation capability using existing signals of opportunity broadcast in the 960-1215 MHz band. An airborne receiver using this technique can determine the relative bearing to a variety of ground based transmitters including Distance Measuring Equipment (DME) stations, ADS-B rebroadcast stations, secondary surveillance radar, Universal Access Transceiver (UAT) ground stations, ADS-B rebroadcast stations, etc. By combining several bearing measurements with information about the known locations of the transmitters (carried in an on-board database) the user's position can be determined. Such angle measurements may also be combined with GNSS measurements, inertial measurements or other navigation measurements in a suitably designed Kalman filter or other type of estimation algorithm in order to enhance fault detection and mitigation capabilities. In this way, spoofing of GNSS can be detected and the potential impact of undetected spoofing attacks limited.

[0023] FIG. 1 illustrates a first embodiment presented herein including a receiver system 10 having a combination of an antenna array assembly 100 and a receiver subsystem 120. The antenna array assembly 100 consists of a number of antenna

elements 102, at least two or more, (here, four being 104, 106, 108 and 110), being arranged in a geometric pattern, (not shown), for example, a square pattern where the four (4) antenna elements 104-110 are arranged equidistant from adjacent antenna elements. The antenna elements 104-110 are connected to a commutating solid state switch device 112 operable to switch the input of one antenna element 104-110 at a time to the input of a Low Noise Amplifier (LNA) (114) over a period of time to produce an output signal of the antenna array assembly 100. The commutating solid state switch array 112 is constructed such that whenever any given antenna element is connected to the output, all the other antenna elements are connected to a 50 Ohm or other high resistance loads.

[0024] The commutating solid state switch device 112 and LNA 114 are powered via a voltage that comes to the antenna array assembly 100 on a center conductor 116 of a single coaxial cable 118 that connects the receiver 120 to the antenna array assembly 100. A timing signal 119, (illustrated by the dashed line passing through the single coaxial cable 118), produced by a sampling clock 151 may also be fed to the antenna via the coaxial cable 116 from the receiver subsystem 120 to the antenna array assembly 100. The timing signal 119 determines the speed at which the commutating switch array switches through each of the antenna elements 102. The timing signal 119 is also provided to the A/D converter 124 to control the sampling times of the converter. The antenna elements 102 and other antenna array assembly elements may be designed to operate on signals in the 960 to 1215 MHz band. However, the RF multiplexing system described here could be generally applied to any frequency band with appropriate design of antenna elements. The result of the antenna array assembly 100 configuration is that RF signals from each of the antenna elements 104-110 are multiplexed onto a single coaxial cable 118 and transmitted (after appropriate

amplification as necessary) to the receiver subsystem 120. The switching of the antenna elements 102 is done at a very high rate, (e.g., 10 - 100 MHz), but at a rate below the Nyquist frequency of the lowest frequency of interest divided by the number of elements, (here four, 104-110), in the array. The embodiments described herein incorporate a system that uses time multiplexing of RF onto the single coaxial cable 118 that enable much simpler installation, i.e., a single coaxial cable between the receiver and antenna array assembly, whereas the current Traffic Collision Avoidance Systems (TCAS) uses four antenna elements using four separate co-axial cables to each independent element in the antenna array.

[0025] The receiver system 10 takes the time-multiplexed RF signals from the antenna array assembly 100 and down converts the signals at a down converter 122 to an intermediate frequency. This intermediate signal is then applied to an A/D converter 124 which samples the signal at well above twice the Nyquist frequency of the intermediate signal. Alternatively, if a high enough sampling rate is used, the multiplexed RF signal could be sampled directly without need for down-conversion at the down converter 122. Either way, the principle of operation as described below remains the same. The sampling rate and antenna element switching rate are arranged so that at least one sample of the RF is obtained within the time period that an antenna element (104-110) is attached. After A/D conversion 124, the digital signals are passed to a signal processing apparatus 130 that may process the digital signals in a software and/or hardware domain. The sampled RF signals are then de-multiplexed at a digital de-multiplexer 132 into separate data streams for each of the antenna elements 104-110.

[0026] One of the data streams 133 containing a signal of interest from at least one antenna element (104-110) is used at a demodulating and message decoding unit 134

to demodulate the signal of interest to determine position information from a broadcast ADS-B signal. This data-stream 133 is hereafter referred to as the primary sampled signal. The airborne receiver unit 10 receives the own-ship GPS position from an on-board GPS receiver 140 and with the two positions, computes at a vector computing unit 138 a vector between the own-ship position and position indicated in the received ADS-B signal. The airborne receiver 10 also receives the airplane pitch, roll and heading information from the on-board Inertial Reference Unit (IRU) system 144 and translates at a vector translation unit 142 the vector from an earth reference frame to an airplane reference frame. Thereafter, an expected AOA signal “ θ_e ” is computed at a computed AOA unit 146 from the received ADS-B position.

[0027] Therefore, the orientation of the antenna array assembly 100 is directly responsible for determining the location and orientation of the platform that carries the airborne receiver unit 10. The receiver unit 120 may have any orientation inside the vehicle; however, the orientation in space of the antenna array assembly 100 must be known to compute the expected AOA of the target aircraft broadcasting the respective ADS-B signal.

[0028] The sampled ‘copies’ of the primary signal 133 from the other antenna elements are processed in parallel with the expected AOA signal calculation and are used to measure at an AOA measuring unit 136 a relative angle of arrival (AOA) of the signal of interest. The primary signal 133 can be used to detect the existence of a pulsed signal, such as an ADS-B report or Distance Measuring Equipment (DME) reply pulses. Then, when a period of signal presence is verified, the relative phase of the carrier between each of the sampled antenna element signals is measured using a phase comparator realized in a digital signal processing algorithm. The phase of each signal can be determined using a Costas loop and a digital reference oscillator, or by

many other well know means. The exact frequency for the digital reference oscillator can be determined by Fast Fourier Transform (FFT) block processing of the sampled signal. The measured AOA signal “ θ_m ” can then be determined from the relative phase of the signal on each antenna element and based on knowledge of the geometry of the antenna elements. The geometry of the antenna elements may be designed in order to better facilitate the AOA measurements. Having both the measured AOA and the expected AOA, these values are compared in an AOA comparing unit 148 to output a target validity indication 150 regarding the validity of the target ADS-B positional information.

[0029] Therefore, the AOA may be determined for any signal that has a relatively stable carrier frequency. In one embodiment presented herein, the AOA measurements may be made for two different purposes: 1) to provide confirmation of the source of an ADS-B report as shown in FIGs 2-3; and, 2) to use AOA measurements from a variety of ground based transmitters in the 960 to 1215 MHz band to create an independent position solution as shown in FIG. 4. Given sufficient processing power and judicious choice of intermediate frequency and sampling rates, both of these functions described herein can be simultaneously supported by the system illustrated by receiver 10 of FIG. 1. However, a receiver system 10 may also be designed to implement only one of these functions or one function at a time.

[0030] FIG. 2 illustrates an aircraft 200 having a heading 202 and a respective heading bearing “ θ_h ” from a North bearing 204. The aircraft receives an ADS-B signal on its airborne receiver unit (similar to receiver 10 of FIG. 1) from a target aircraft 250 with information regarding the purported position of the aircraft 250. The airborne receiver unit 10 demodulates and decodes the ADS-B signal to determine the purported position information of the aircraft 250. The airborne receiver unit 10

further receives the own-ship GPS position and with these two positions computes a vector between the own-ship position and position purported in the received ADS-B signal for aircraft 250. The airborne receiver 10 proceeds to receives own-ship pitch, roll and heading information from an on-board Inertial Reference Unit (IRU) system and translates the vector from an earth reference frame to an airplane reference frame to produce an expected AOA bearing " θ_e " from the received ADS-B position.

[0031] The receiver 10 simultaneously processes the ADS-B signal received from the aircraft 250 and determines a measured AOA bearing " θ_m " from the relative phase of the signal on each antenna element as described above. Any difference between expected AOA bearing θ_e and the measured AOA bearing θ_m to the airplane 250 becomes a detection statistic that can be used in a hypothesis test. The hypothesis is that the ADS-B report actually comes from the location (here target aircraft 250) reported in the ADS-B message. Any difference between the expected AOA bearing θ_e and the measured AOA bearing θ_m is compared to a threshold that is derived based on the accuracy of the AOA measurements such that an acceptable probability of a false detection is achieved. In Fig. 2, since the expected AOA bearing θ_e to the aircraft 250 and the measured AOA bearing θ_m to the aircraft 250 are within the tolerance established by the chosen threshold, the receiver 10 may give an indication that the purported location of the aircraft 250 is indeed authentic.

[0032] FIG. 3 illustrates an aircraft 300 having a heading 302 and a respective heading bearing θ_h from a North bearing 304. The aircraft receives an ADS-B signal on its airborne receiver unit (similar to receiver 10 of FIG. 1) from a transmitter 360 with information regarding a purported position of a purported target aircraft 350. The airborne receiver unit 10 demodulates and decodes the ADS-B signal to determine the purported position information of the target aircraft 350. The airborne

receiver unit 10 further receives the own-ship GPS position and with these two positions computes a vector between the own-ship position and position purported in the received ADS-B signal for target aircraft 350. The airborne receiver 10 proceeds to receives own-ship pitch, roll and heading information from an on-board Inertial Reference Unit (IRU) system and translates the vector from an earth reference frame to an airplane reference frame to produce an expected AOA signal “ θ_e ” from the received ADS-B position.

[0033] The receiver 10 simultaneously processes the ADS-B signal received from the transmitter 350 and determines a measured AOA signal “ θ_m ” from the relative phase of the signal on each antenna element as described above. In the scenario of FIG. 3, a difference between the expected AOA bearing θ_e and the measured AOA bearing θ_m to the airplane 350 is used in the hypothesis test, described above, where the ADS-B report actually comes from the location, (here target aircraft 350), reported in the ADS-B message. The difference $\Delta\theta_{m-e}$ between the expected AOA bearing θ_e and the measured AOA bearing θ_m is compared to a threshold, and in this scenario, is substantially different enough to trigger an indication or an alarm to be output by the receiver 10 thus giving an indication that the purported location of the aircraft 350 is not authentic, i.e., it is being “spoofed” by a signal transmitted at the location of the transmitter 360. The warning indication output by the receiver 10 may further output an indication that may identify the target aircraft 350 as having an invalid ADS-B signal.

[0034] The second application using the measured AOA values includes an alternative position determination system, as illustrated in FIG. 4. Using the techniques described above, AOA measurements based on the relative phase of the carrier between each of the sampled antenna element signals may be made to a variety

ground transmitters that are broadcasting signals for a variety of other purposes. These ‘signals of opportunity’ are numerous and could exist in virtually any band. In the one embodiment described herein, the measurements are made of signals broadcast in the 960 to 1215 MHz band. This band is chosen because these ‘signals of opportunity’ are broadcast by sources that are provided by aviation service providers in bands that are allocated by the International Telecommunication Union (ITU) for safety of life applications. Hence the acceptance of use of these signals by aviation authorities should be possible. The signals to be used may include but are not limited to the following.

[0035] 1 – Distance Measuring Equipment (DME) reply pulses. These are pulse pairs broadcast by a DME ground station in reply to interrogations by airborne users. The reply pulses may be intended for the airplane that the AOA navigation system resides on, or they may be intended as replies to interrogations from other airplanes. Only the AOA information is used and the timing associated with DME ranging is ignored. DME reply pulses are also generated by a ground station without any associated interrogation pulses in order to keep the duty cycle of the transmitter in an acceptable range.

[0036] 2 – 1090 MHz ADS-B Re-broadcast messages, which are ADS-B reports broadcast from the ground telling of airplane positions for airplanes using non-1090 MHz ADS-B.

[0037] 3 – 1030 MHz Secondary Surveillance Radar (SSR) interrogations from SSR radars at known locations.

[0038] 4 – Future L-Band Digital Aeronautical Communications System (LDACS) communications transmissions. A proposal exists for a new communication system

called LDACS which is intended to exist in the 960-1215 MHz band. It is further proposed that LDACS may provide a range determination function which could easily be accommodated in the envisioned receiver system as well. In addition to the LDACS ranging, this AOA measurement could be applied for further authentication and/or fault detection and mitigation.

[0039] 5 – Future DME band based ‘pseudolite signals’. One of the proposals for a future non-GNSS position determination signal is to implement a new ground based ranging source in the DME band. The AOA measurement signals could take advantage of those signals as well should they ever exist.

[0040] 6 – Universal Access Transceiver (UAT) ground station transmissions. One of the standards for ADS-B used in the United States includes ground based transmissions at 978 MHz. The UAT technology allows additional information to be uplinked to aircraft from ground stations through FIS-B (Flight Information System – Broadcast). This information includes weather and Temporary Flight Restriction (TFR) information.

[0041] FIG. 4 illustrates the navigation system based on AOA determination where an aircraft 400 with airborne receiver equipment, similar to receiver 10 of FIG. 1, includes a database of known transmitters and their locations. The airborne receiver will select frequencies to examine based on the current estimated position and transmitters that are known to exist in the area. If the position is unknown, the receiver can begin by searching 1030 and 1090 MHz looking for transmissions from fixed locations. Once signals are found there, DME frequencies can be searched until active reply channels are found. Once enough angles to transmitters are known, frequencies are found, and an algorithm can be applied to determine position by

looking through all possible combinations of ground stations with the same frequencies and then find a combination for which the AOA measurements result in a self-consistent position. The more ground stations that can be measured, the faster an over-determined position solution will be produced.

[0042] FIG. 4 illustrates an aircraft 400 having a heading 402 and a respective heading bearing θ_h from a North bearing 404. The receiver on the aircraft 400, (like receiver 10 in FIG. 1), that measures the AOA values may receive a signal from a first DME transponder D_1 410 sending reply pulses to all users and measure an AOA as θ_{D_1} . The receiver on the aircraft 400 may receive a signal from a ground based ADS-B re-transmit source A 420 and measure an AOA for as θ_A . Similarly, the receiver on the aircraft 400 may receive a signal from a ground based DME transponder P 430 that is paired with a localizer and measure an AOA for as θ_P . Likewise, the receiver on the aircraft 400 may receive a signal from a second ground based DME transponder D_2 440 sending reply pulses to all users and measure an AOA for as θ_{D_2} . And similarly, the receiver on the aircraft 400 may receive a signal from radar R 450 having a known position and measure an AOA for as θ_R .

[0043] The embodiments described herein are different than other proposed Alternate Position and Navigation and Timing (APNT) systems in that they do not provide precise time transfer to the airborne receiver, but they also do not require precise time synchronization of ground based or airborne assets to operate. The embodiments described herein can produce a position estimate based on bearing measurements only and without range measurements. The embodiments described herein do not require any new ground-based infrastructure, but only airborne equipment. The embodiments described herein may also be used in ground based receivers to provide position

determination capability. The embodiments described herein allow for simpler, cheaper ground systems that can provide independent positioning capability.

[0044] The embodiments described herein address the above solutions in a relatively simple easy to install receiver package, and solves the lack of ADS-B authentication problem for which there is no other adequate solution proposed for airborne equipment. By combining several bearing measurements with information about the known locations of the transmitters, (carried in an on-board database), the user's position can be determined. Such angle measurements may be combined with GNSS measurements, inertial measurements or other navigation measurements in a suitably designed Kalman filter or other type of estimation algorithm in order to enhance fault detection and mitigation capabilities. In this way, spoofing of GNSS can be detected and the potential impact of undetected spoofing attacks limited.

[0045] FIG. 5 illustrates a logic flowchart for a method of measuring an Angle of Arrival (AOA), including cycling 500 a commutating solid state switch 112 between each antenna element of a multi-element array antenna 102 based on a synchronization signal received from an analog-to-digital (A/D) converter 124 of a receiver system 10. At least one signal is received 502 at the multi-element array antenna 102 and the at least one signal proceeds to be converted 504 at an A/D converter 124 into a plurality of antenna element specific digital samples for each discrete signal. The plurality of antenna element specific digital samples proceed to be de-multiplexed 506 into discrete digital data streams for each antenna element of the multi-element array antenna, and thereafter, a measured AOA is determined 508 of the at least one signal based on measuring a relative phase of a carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna.

[0046] The receiver at 510 may make a determination regarding what type of functional application it assumes to further process the received signals. Since different types of signals are transmitted on different frequencies, the receiver 10 knows the type of signal it processes when it tunes to that particular frequency. Furthermore, the receiver exploits knowledge about the general signal structure when measuring the phase to determine the measured AOA as described above. When the receiver assumes the function of providing ADS-B authentication 512, the ADS-B signal received at the receiver is further processed with antenna array position and orientation information to verify the authenticity of that position information as compared to a measured AOA calculation performed above. FIG. 6 illustrates a continuation of the logic flowchart from FIG. 5 for a method that further decodes 600 the indicated positional data from the target transmitter from one discrete digital data stream for a single antenna element of the multi-element array antenna via an ADS-B signal demodulation process. The expected AOA of the target transmitter proceeds to be determined 602 derived from the decoded indicated positional data from the target transmitter, and positional information defining a location of the receiver system and heading information defining an orientation of the antenna subsystem of the receiver system. The expected AOA proceeds to be compared 604 to the measured AOA to verify the indicated positional data from the target transmitter in the received ADS-B signal. Finally, an indication of authenticity is provided 606 based on verifying the indicated positional data from the target transmitter.

[0047] When the receiver assumes the function of providing navigation and position determination at 510 of FIG. 5, a plurality of signals from emitters of opportunity may be received 514 at the receiver unit 10 for further processing illustrated in FIG. 7 as a continuation of the logic flowchart from FIG. 5. The receiver 10 is able to receive

many types of signals simultaneously in the 960-1215MHz band and may tune to a specific frequency analyze a particular type of signal for use while operating in the navigation and position determining function. The method in this instance includes receiving a plurality signals from at least two ground based emitters. An identity is retrieved 700 for each respective emitter from a database based on the carrier frequency and a signal type of the emitter. Then, a location proceeds to be retrieved 702 for each emitter from the database based on the identity of each respective emitter. AOAs for each respective emitter signal then proceed to be determined 704 based on measuring the relative phase of the carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna. Finally, an independent position fix of the antenna subsystem of the receiver system is computed 706 based on the AOA measurements and each respective emitter location.

[0048] FIG. 8 illustrates a schematic diagram of a ground-based system 800 of networked AOA receivers 810-830 and network equipment 850 that process and authenticate ADS-B signals to both provided positional information on aircraft 802 and may detect and locate the source of bad actors or spoofers transmitting ADS-B signals that misrepresent a true position. Based on the principles of the embodiments presented above, the networked ground-based AOA receivers 810-830 may independently determine all aircraft positions, and may thereby act as a “back-up” surveillance system without having any requirement precise time synchronization.

[0049] The above implementation may use the known location of ground-based AOA receivers 810-830 and their respective measured bearings θ_1 - θ_3 to airborne targets (e.g., target aircraft 802), to independently determine the target’s location. The measured results are compared to the position reported by the target via the ADS-B

signal information. Any difference in the measured verses the reported position is applied as test statistic in the classical hypothesis test to detect spoofing of the airborne target. The location of spoofer can thereby be determined without cooperation of the spoofer, and the location of all ADS-B traffic can be independently determined yielding a AOA surveillance backup capability when GPS information is denied or unavailable. The subject matter described above is provided by way of illustration only and should not be construed as limiting. Various modifications and changes may be made to the subject matter described herein without following the example embodiments and applications illustrated and described, and without departing from the true spirit and scope of the present disclosure, which is set forth in the following claims.

CLAIMS

1. An aircraft receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification of a target aircraft, comprising:

a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft;

a second input for receiving positional information and heading information indicating the location and orientation of a multi-element array antenna configured to be attached to the receiver;

a processing module operative to

generate a measured bearing derived from angle of arrival data, and

generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional information and heading information defining the receiver location and orientation;

a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

2. The aircraft receiver according to claim 1, wherein the processing module being further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional information,

wherein computing the vector being based on receiving the positional information from a Global Navigation Surveillance System (GNSS) indicating the location of the multi-element array antenna.

3. The aircraft receiver according to claim 2, wherein the processing module being further operative translate the vector from an earth reference frame to an airplane reference frame based the heading information including pitch, roll and heading data generated from an Inertial Reference Unit (IRU) indicating the orientation of the multi-element array antenna.

4. The aircraft receiver according to claim 1, wherein the processing module being further operative generate the measured bearing based on measuring a relative phase of a carrier signal identified in the first input.

5. The aircraft receiver according to claim 1, further comprising an Analog-to-Digital (A/D) converter for processing signals received on the first input, wherein the A/D processing transmits a synchronizing signal to a commutating multiple-element array antenna that feeds the signals to the first input.

6. A receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification, comprising:

a processing module receiving an ADS-B signal from a target aircraft including indicated positional data, and operative to

generate a measured bearing derived from detection of an angle of arrival of the ADS-B signal, and

generate an expected bearing of the target aircraft derived from the indicated positional data of the ADS-B signal, and positional and heading information of a location and orientation of a multi-element array antenna configured to be attached to the receiver;

a comparator for comparing the expected bearing to the measured bearing and for verifying the ADS-B indicated positional data of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B indicated positional data of the target aircraft.

7. The receiver according to claim 6, wherein the processing module being further operative to compute a vector from the receiver location to the target aircraft based on the indicated positional data,

wherein computing the vector being based on receiving the positional information from a Global Navigation Satellite System (GNSS) indicating the location of the multi-element array antenna.

8. The receiver according to claim 7, wherein the processing module being further operative to translate the vector from an earth reference frame to an airplane reference frame based the heading information including pitch, roll and heading data generated from an Inertial Reference Unit (IRU) indicating the orientation of the multi-element array antenna.

9. The receiver according to claim 6, wherein the processing module being further operative to generate the measured bearing based on measuring a relative phase of a carrier signal of the ADS-B signal from the target aircraft.

10. The receiver according to claim 6, further comprising an Analog-to-Digital (A/D) converter processing ADS-B signals received from the target aircraft, wherein the A/D processing is synchronized to a commutating multiple-element array antenna feeding the ADS-B signals to the receiver.

11. A system for automatic dependent surveillance broadcast (ADS-B) verification, comprising:

an antenna array assembly having a multiple-element antenna array for receiving ADS-B signals from a target aircraft, the ADS-B signals including indicated positional data; and

a receiver configured to receive the ADS-B signals from the antenna array assembly and to measure an angle of arrival of the ADS-B signals relative to the orientation of the antenna array assembly, wherein the receiver comprises:

a first input for receiving ADS-B flight tracking information from the target aircraft at the receiver, the ADS-B flight tracking information including indicated positional information of the target aircraft;

a second input for receiving positional information and heading information indicating the location and orientation of the receiver;

a processing module operative to

generate a measured bearing derived from angle of arrival data,

and

generate an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the

positional information and heading information defining the receiver location and orientation; and

a comparator for comparing the expected bearing to the measured bearing and verifying the ADS-B flight tracking information of the target aircraft; and

an output device for outputting an indication of authenticity based on verifying the ADS-B flight tracking information of the target aircraft.

12. The system according to claim 11, where the antenna array assembly further comprises a commutating solid state switch that cycles between each antenna element of a multi-element array antenna.

13. The system according to claim 12, where the receiver further comprises an analog-to-digital (A/D) converter that receives the ADS-B signals and controls the cycling of the commutating solid state switch with a synchronization signal.

14. The system according to claim 11, wherein the processing module being further operative to decode the indicated positional data from the target transmitter from one discrete digital data stream for a single antenna element of the multi-element array antenna via an ADS-B signal demodulation process; and

determine an expected AOA of the target transmitter derived from the decoded indicated positional data from the target transmitter, and positional information defining a location of the receiver and heading information defining an orientation of the antenna array assembly.

15. The system according to claim 14, wherein the processing module being further operative to compare the expected AOA to the measured AOA to verify the indicated positional data from the target transmitter in the received ADS-B signal; and

provide an indication of authenticity based on verifying the indicated positional data from the target transmitter.

16. A method of measuring an Angle of Arrival (AOA), comprising:
cycling a commutating solid state switch between each antenna element of a multi-element array antenna based on a synchronization signal received from a receiver system;

receiving at least one signal at the multi-element array antenna so that a time multiplexed RF signal is received at an output of the commutating solid state switch;

converting the time multiplexed RF signal at an analog-to-digital (A/D) converter based on the synchronization signal into a plurality of antenna element specific digital samples for each discrete signal;

de-multiplexing the plurality of antenna element specific digital samples into discrete digital data streams for each antenna element of the multi-element array antenna; and

determining a measured AOA of the at least one signal based on measuring a relative phase of a carrier signal identified in each discrete digital data stream of the respective antenna elements of the commutating multi-element array antenna.

17. The method according to claim 16, where the signal comprises an ADS-B signal including indicated positional data from a target transmitter.

18. The method according to claim 17, further comprising:
decoding the indicated positional data from the target transmitter from one discrete digital data stream for a single antenna element of the multi-element array antenna via an ADS-B signal demodulation process;

determining an expected AOA of the target transmitter derived from the decoded indicated positional data from the target transmitter, and positional information defining a location of the receiver system and heading information defining an orientation of an antenna subsystem of the receiver system;

comparing the expected AOA to the measured AOA to verify the indicated positional data from the target transmitter in the received ADS-B signal; and

providing an indication of authenticity based on verifying the indicated positional data from the target transmitter.

19. The method according to claim 16, where the at least one signal comprises a plurality of signals from at least two emitters of signals of opportunity.

20. The method according to claim 19, further comprising:
retrieving an identity for each respective emitter from a database;
determine a location for each emitter based on the identity for each respective emitter from the database;

determining AOAs for each signal from the respective emitters based on measuring the relative phase of the carrier signal identified in each discrete digital

data stream of the respective antenna elements of the commutating multi-element array antenna; and

compute an independent position fix of the antenna subsystem of the receiver system based on the AOAs locations and each respective emitter location.

ABSTRACT

The present disclosure is directed to a receiver for Automatic Dependent Surveillance Broadcast (ADS-B) verification of a target aircraft including a first input for receiving flight tracking information from a target aircraft that indicates positional information of the target aircraft. The receiver further includes a second input for receiving positional and heading information indicating the location and orientation of a multi-element array antenna configured to be attached to the receiver, and a processing module that generates a measured bearing derived from angle of arrival data, and an expected bearing of the target aircraft derived from the indicated positional information of the target aircraft and the positional and heading information defining the receiver location and orientation. A comparator compares the expected bearing to the measured bearing and verifies the ADS-B flight tracking information of the target aircraft and outputs an indication of authenticity based on the verification.

FIG. 1

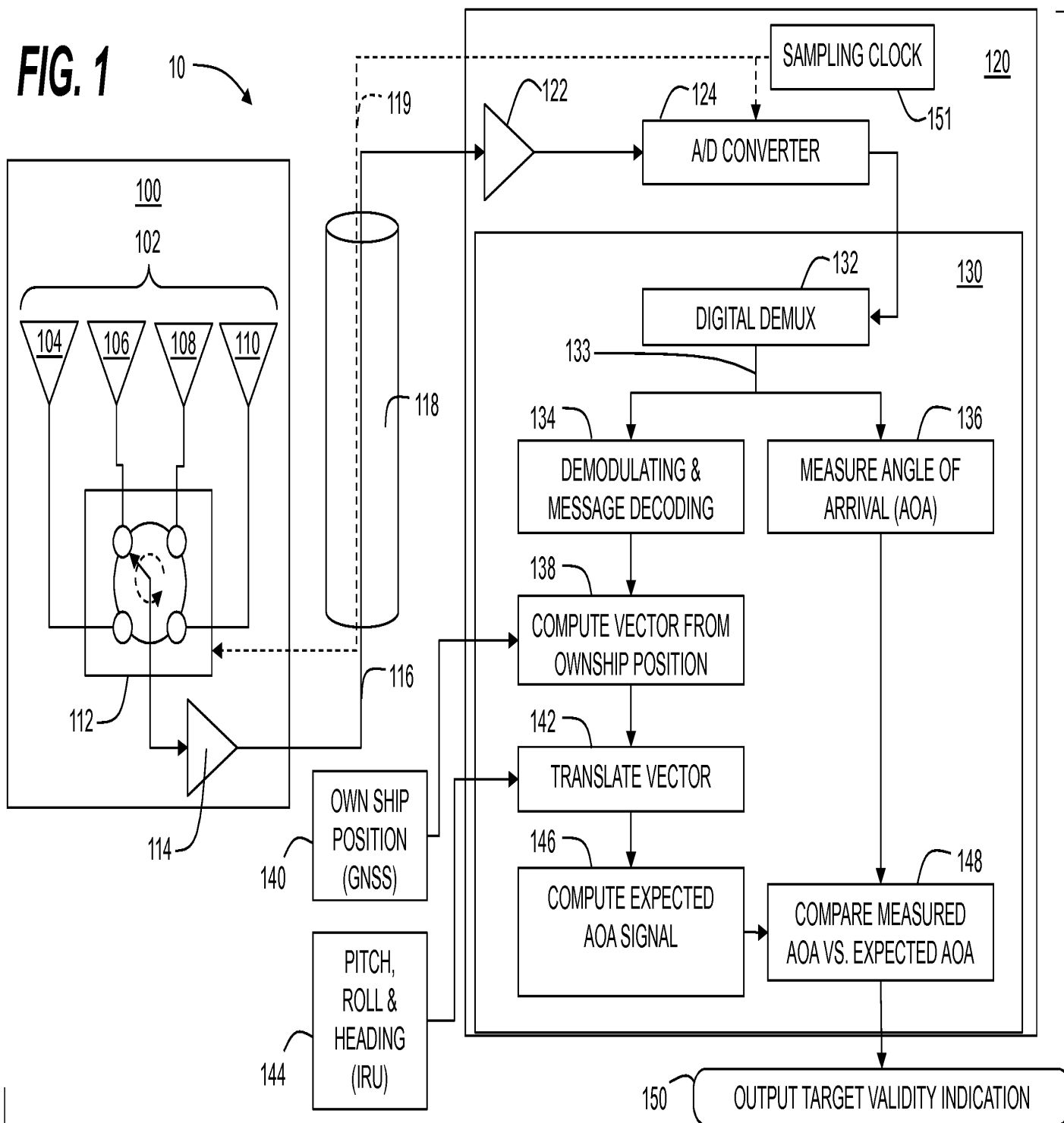




FIG. 2

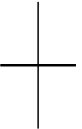
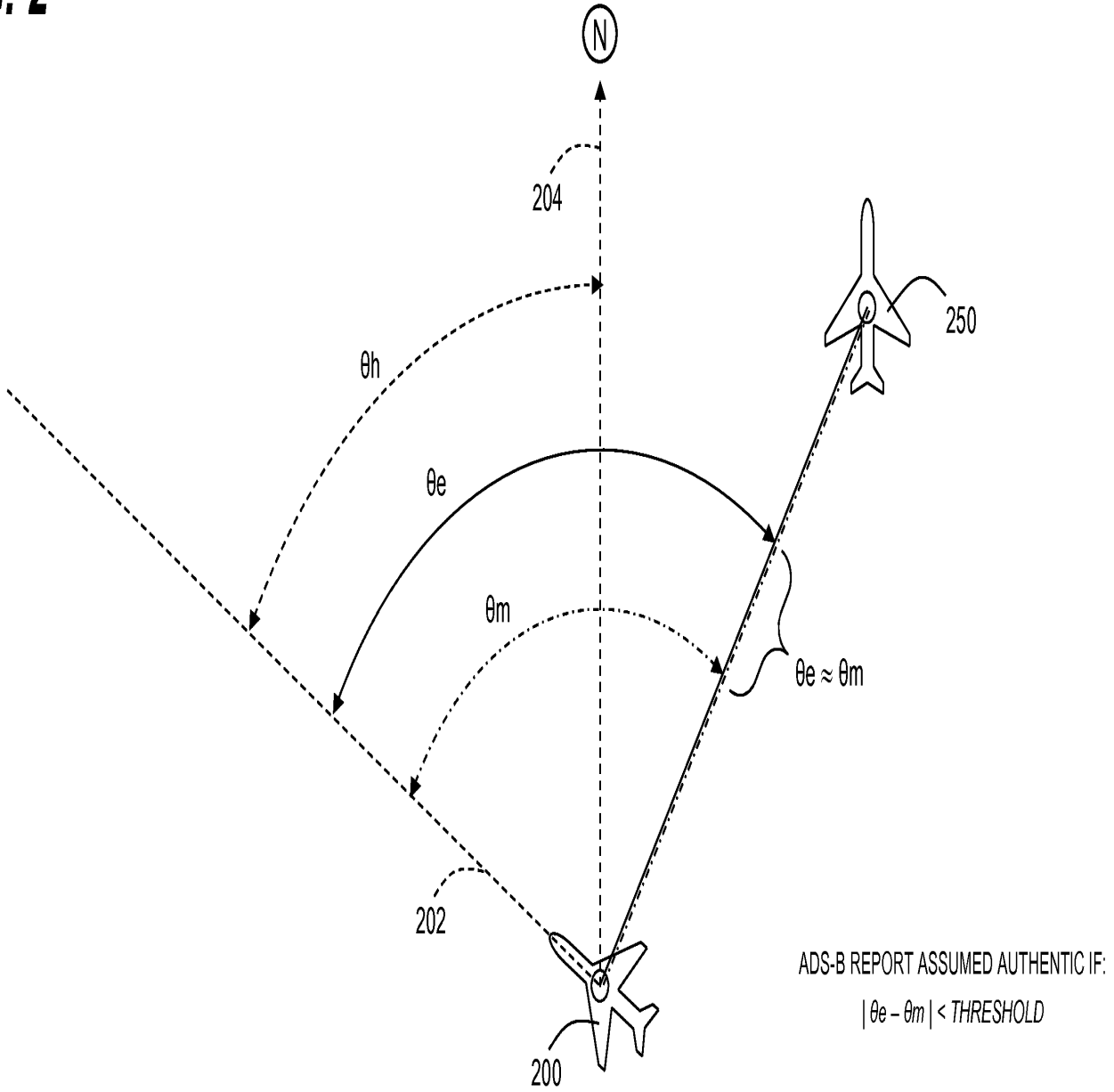


FIG. 3

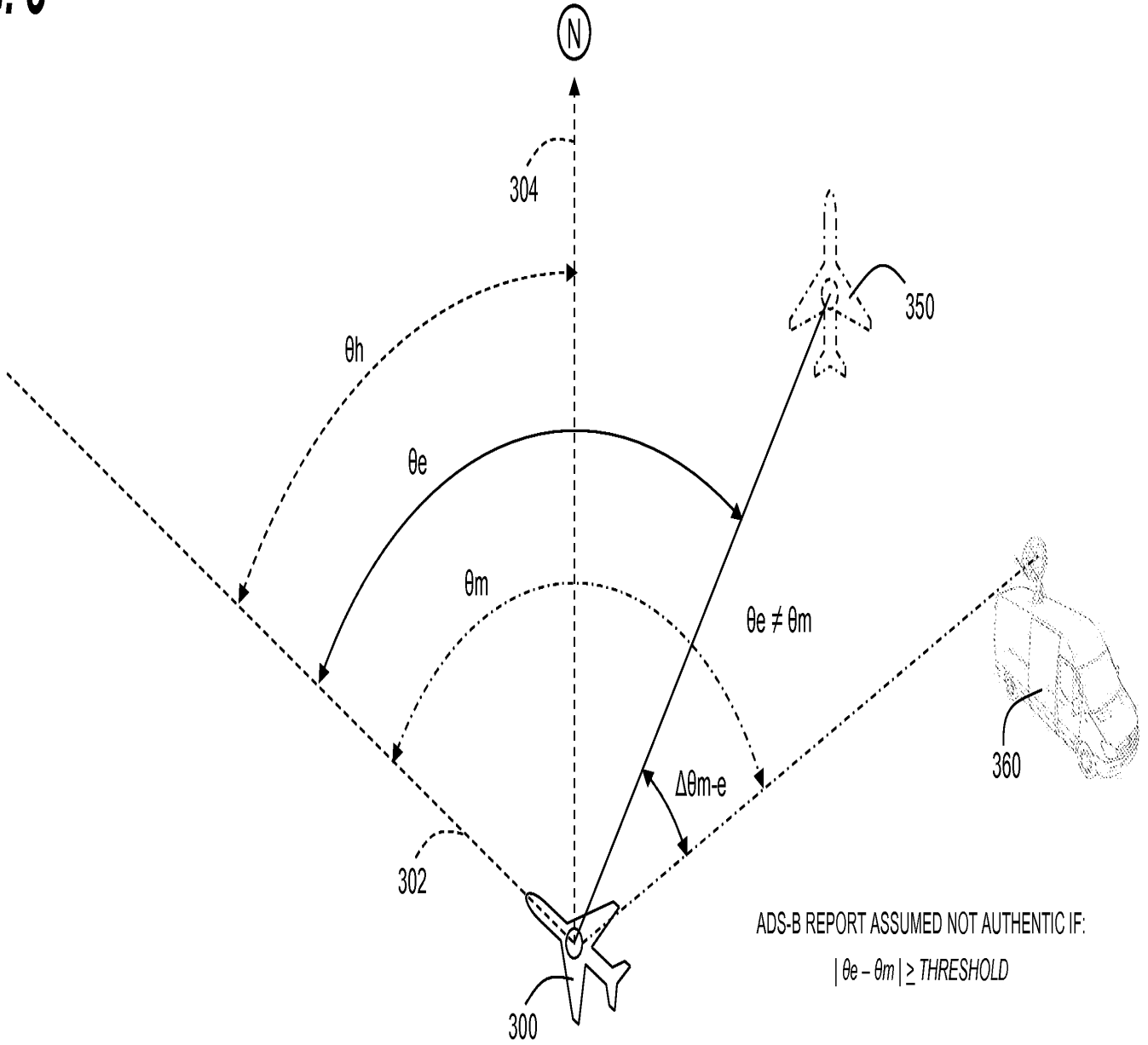




FIG. 4

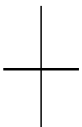
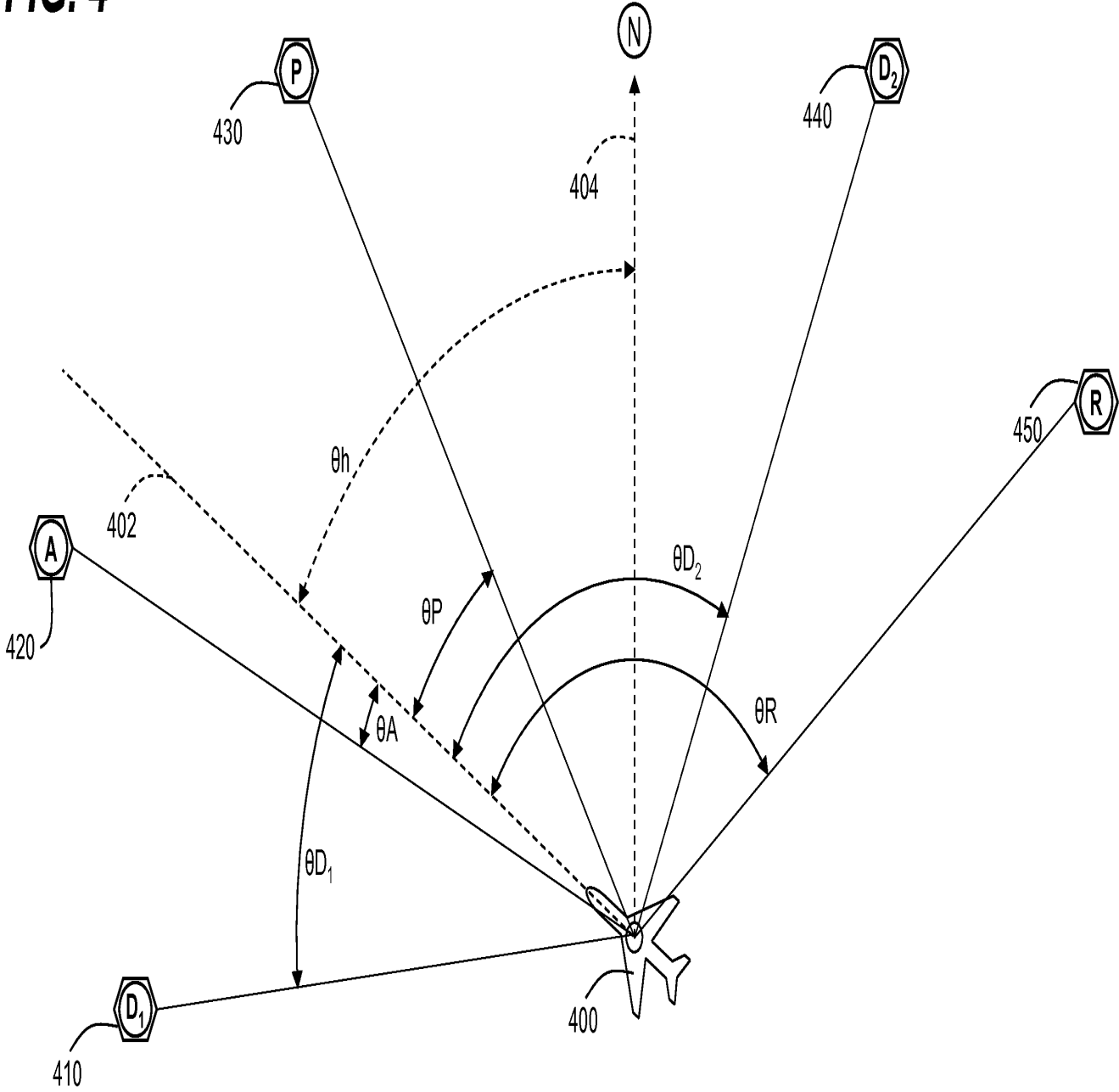


FIG. 5

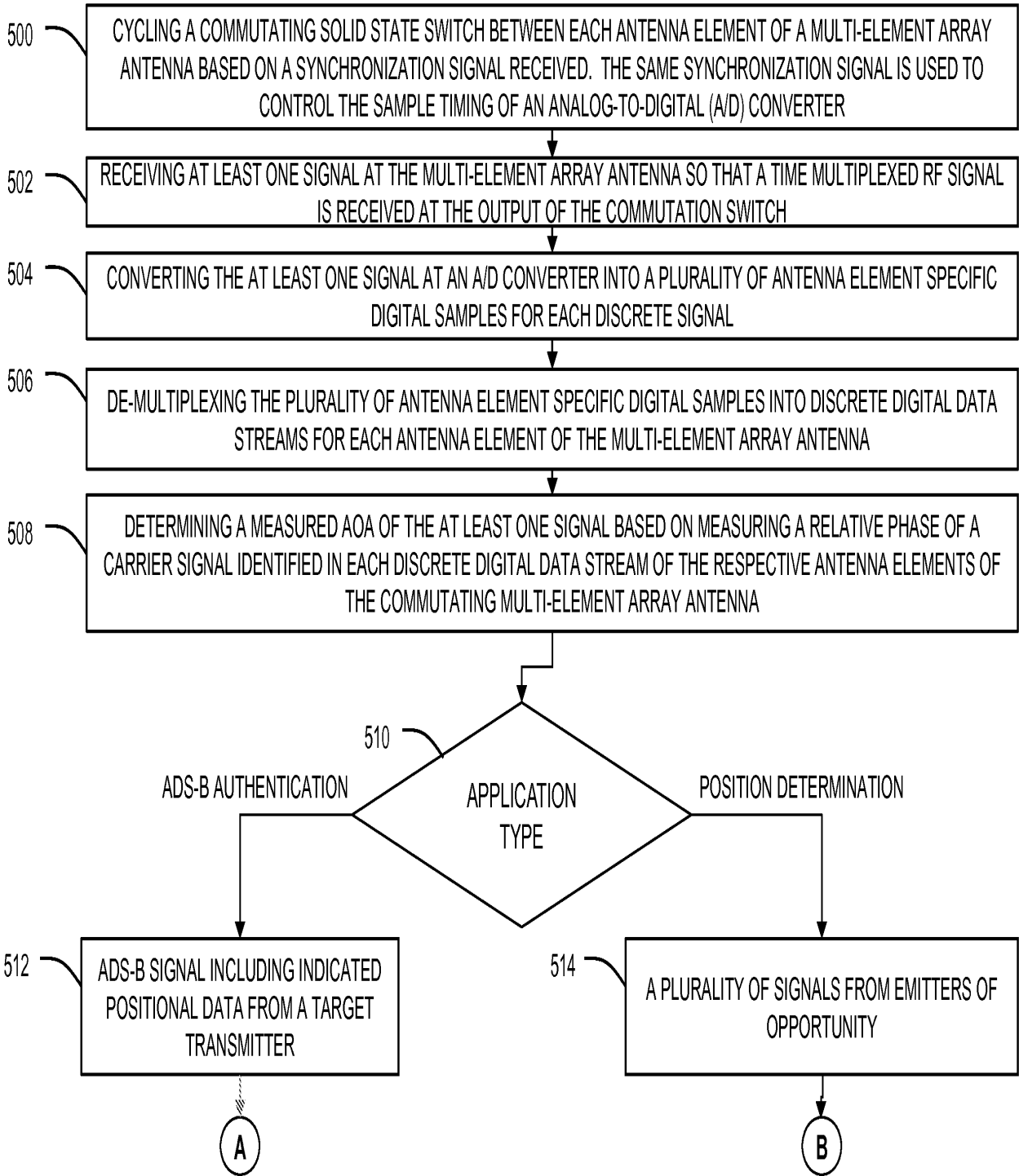


FIG. 6

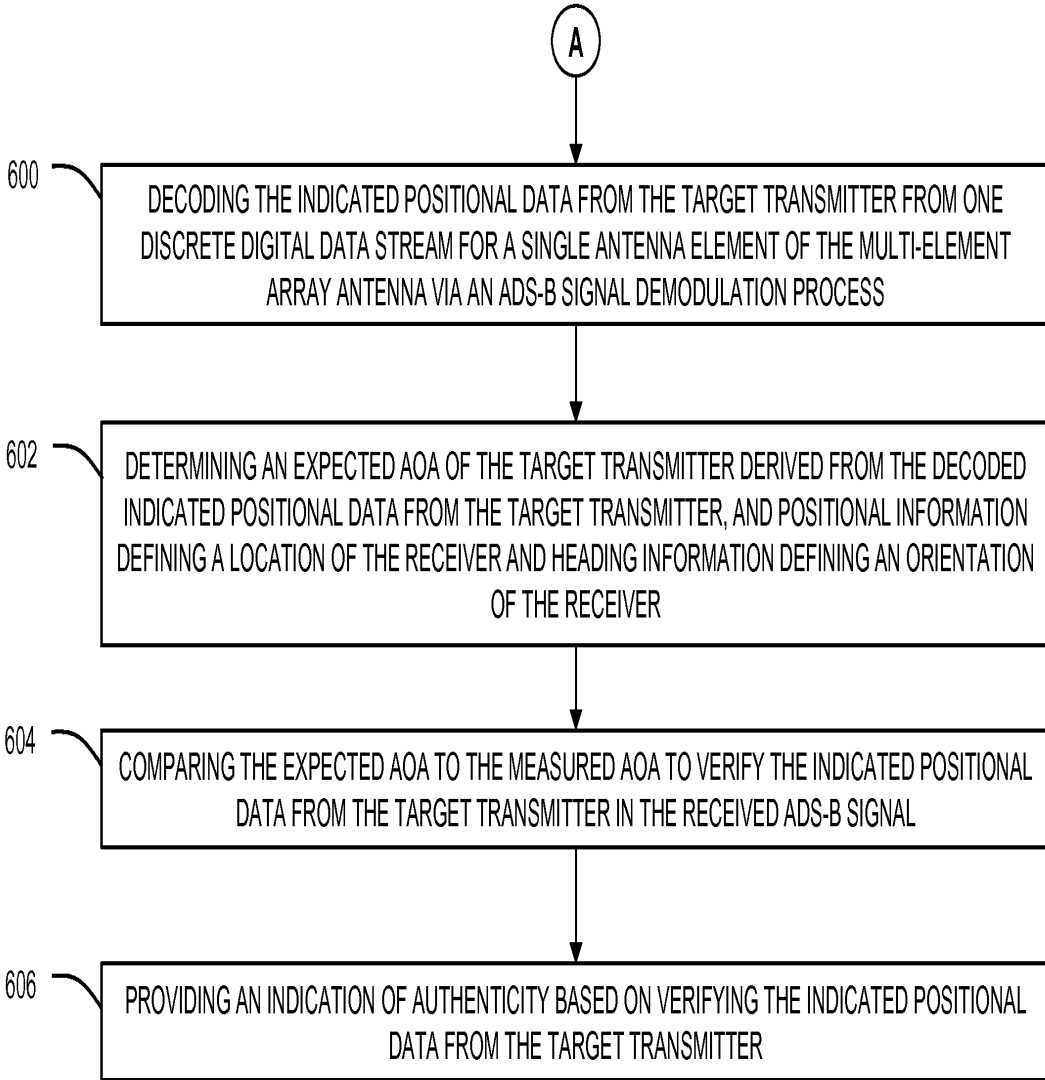
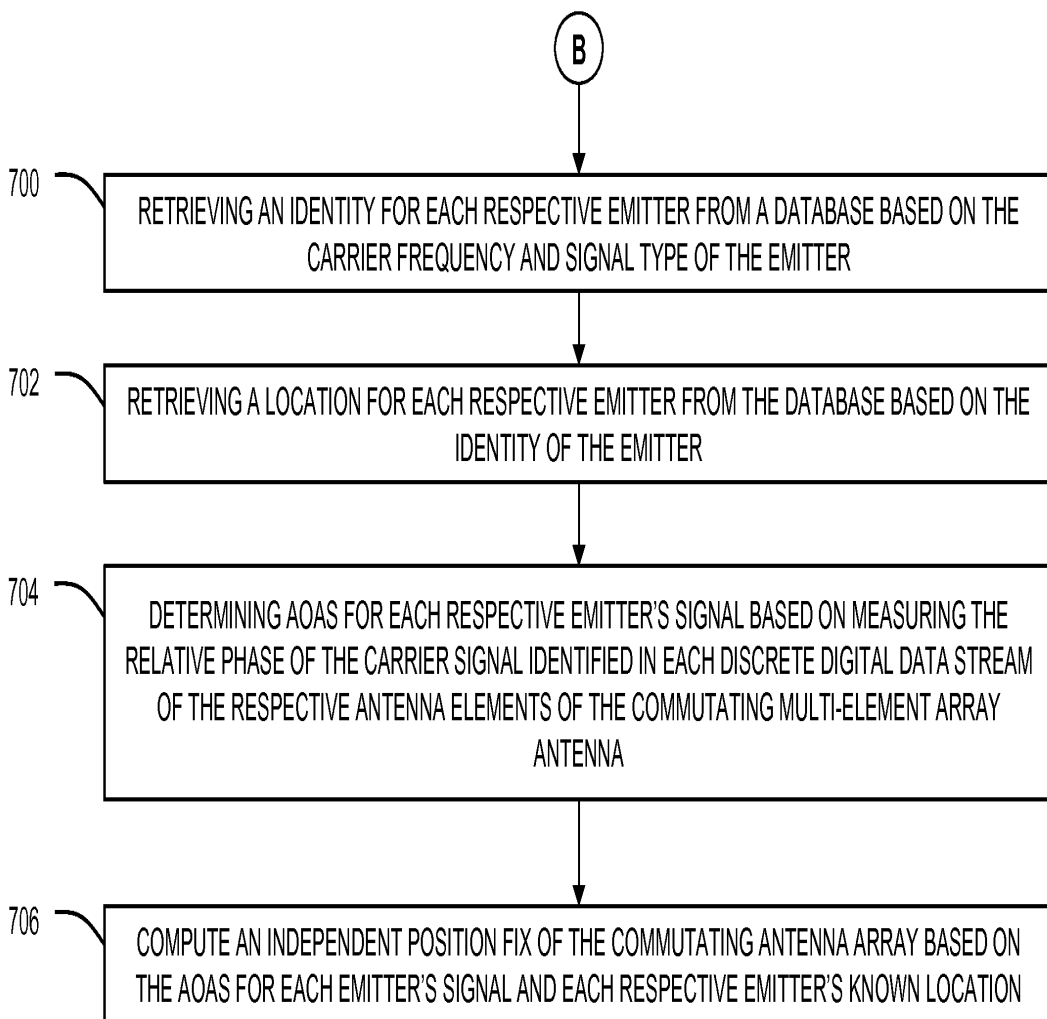


FIG. 7



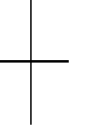
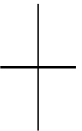
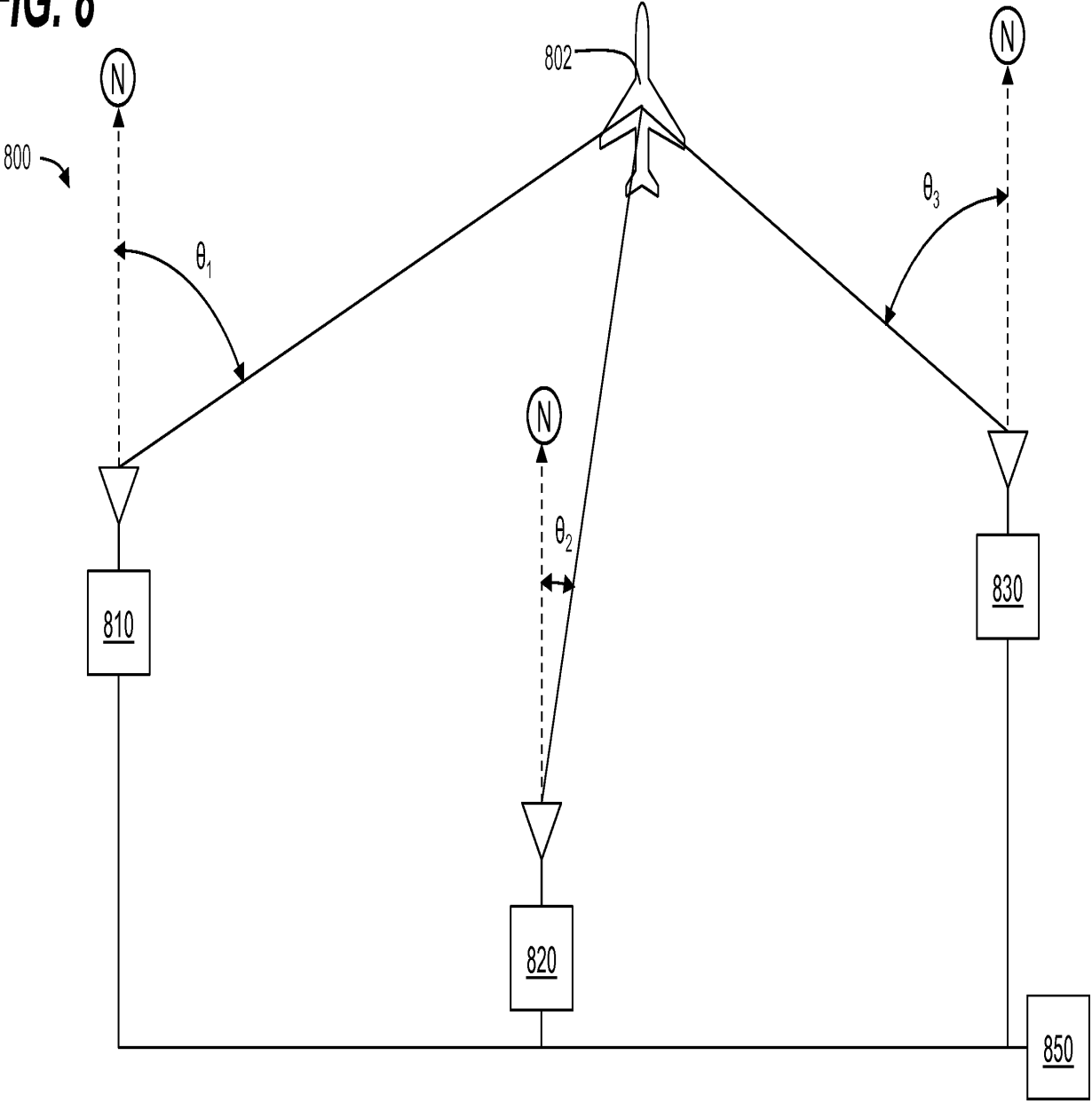


FIG. 8



Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION
First Named Inventor/Applicant Name:	Timothy Allen Murphy
Filer:	Donald Jefferson Lecher
Attorney Docket Number:	12-1366/60055.0205US01

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Utility application filing	1011	1	280	280
Utility Search Fee	1111	1	600	600
Utility Examination Fee	1311	1	720	720

Pages:

Claims:

Independent claims in excess of 3	1201	1	420	420
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Miscellaneous-Filing:

Petition:

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)			2020	

Electronic Acknowledgement Receipt

EFS ID:	15671696
Application Number:	13875749
International Application Number:	
Confirmation Number:	6872
Title of Invention:	DEVICE, SYSTEM AND METHODS USING ANGLE OF ARRIVAL MEASUREMENTS FOR ADS-B AUTHENTICATION AND NAVIGATION
First Named Inventor/Applicant Name:	Timothy Allen Murphy
Customer Number:	75741
Filer:	Donald Jefferson Lecher
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Attorney Docket Number:	12-1366/60055.0205US01
Receipt Date:	02-MAY-2013
Filing Date:	
Time Stamp:	15:49:23
Application Type:	Utility under 35 USC 111(a)

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Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$2020
RAM confirmation Number	2465
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Transmittal of New Application	12-1366_Transmittal-Appln.pdf	276693 061e185a204068cd309b12c99e95d4679dc8df09	no	2
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	12-1366_Fee_Transmittal.pdf	258771 19ccb8604daff31de64e3b75571567d57030e9f8	no	2
Warnings:					
Information:					
3	Nonpublication request from applicant.	12-1366_Nonpublication.pdf	234797 62de990a9b227bd2fa9682af20076cef6eccbc80	no	2
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Information:					
4	Power of Attorney	12-1366_Transmittal_POA.pdf	280465 9c3cf707783d6a09b4968f651def6ef19f806293	no	2
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The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
6	Application Data Sheet	12-1366_Application_Data_Sheet.pdf	1503431 c4909a0af2207047aa0e3f856c9728b89c3058c0	no	6
Warnings:					
Information:					
7	Transmittal Letter	12-1366_IDS_Cover_Letter.pdf	139409 aa8847fc2038b372b3e99f03c3fbd7b6e3a08af7	no	3
Warnings:					
Information:					
8	Information Disclosure Statement (IDS) Form (SB08)	12-1366_IDS_SB08a.pdf	612806 6d472b63706f4d8e63ddc9d35bf82b943ccd0c6	no	6
Warnings:					
Information:					
9		12-1366DRAF3-Final.pdf	302269 8b216cf9397aac4544f92b51339818c03ae019cd	yes	29

Multipart Description/PDF files in .zip description			
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Information:

10	Drawings-only black and white line drawings	12-1366DRAWUS-Final.pdf	275114 fc51c64d43de545256bc7b5cf9c5e4ffe440655bb	no	8
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Warnings:

Information:

11	Fee Worksheet (SB06)	fee-info.pdf	36639 4c00ae3581b46745ff4333e388b02021b7d07531	no	2
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Warnings:

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Total Files Size (in bytes):			4684662
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

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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

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