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- (71) **Applicant:** DRONESHIELD, LLC [US/US]; 590 Herndon Parkway, Suite 300, Herndon, Virginia 20170 (US).
- (72) **Inventors:** FRANKLIN, John; 1618 New Jersey Avenue, N.W., Washington, District of Columbia 20001 (US). HEARING, Brian; 6369 Burton Circle, Falls Church, Virginia 22041 (US).
- (74) **Agents:** MAJEWSKI, Dennis A. et al.; K&L Gates LLP, c/o Foreign Patents, P.O. Box 1135, Chicago, Illinois 60690-1135 (US).
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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

- (88) **Date of publication of the international search report:**
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(54) **Title:** DRONE DETECTION AND CLASSIFICATION WITH COMPENSATION FOR BACKGROUND CLUTTER SOURCES

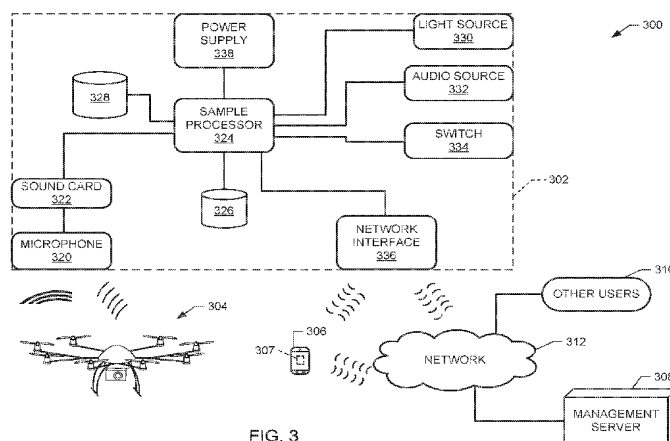


FIG. 3

(57) **Abstract:** A system, method, and apparatus for detecting drones are disclosed. An example method includes receiving a digital sound sample and partitioning the digital sound sample into segments. The method also includes applying a frequency and power spectral density transformation to each of the segments to produce respective sample vectors. For each of the sample vectors, the example method determines a combination of drone sound signatures and background sound signatures that most closely match the sample vector. The method further includes determining, for the sample vectors, if the drone sound signatures in relation to the background sound signatures that are included within the respective combinations are indicative of a drone. Conditioned on determining that the drone sound signatures are indicative of a drone, an alert message indicative of the drone is transmitted.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 16/63491

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G01S 3/80; G01S 5/18 (2017.01)

CPC - B64C 39/024; B64C 2201/00; G01S 3/80; G01S 5/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y --- A	US 2015/0302858 A1 (HEARING et al.) 22 October 2015 (22.10.2015), Fig 3, 4, 8, 15, abstract, para [0054], [0095], [0096], [0116], [0131]-[0139]	16-20 ----- 1-7, 9-13
Y --- A	US 2015/0063575 A1 (TAN) 05 March 2015 (05.03.2015), abstract, para [0103], [0108], [0110]	16-20 ----- 1-7, 9-13
Y --- A	US 2015/0237569 A1 (JALALI) 20 August 2015 (20.08.2015), abstract	17, 18/(17)
Y --- A	US 2014/0226838 A1 (WINGATE et al.) 14 August 2014 (14.08.2014), abstract, para [0012]	1-7, 9-13

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

03 July 2017

Date of mailing of the international search report

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Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 16/63491

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☒ Claims Nos.: 8, 14, 15
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.