

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)**

To:

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Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
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FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/TR2017/000111

International filing date (day/month/year)
25.10.2017

Priority date (day/month/year)
13.04.2017

International Patent Classification (IPC) or both national classification and IPC
INV. G06F21/88 H04L29/08 H04W4/38 ADD. H04W52/02 H04W4/02

Applicant
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1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA:




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see form
PCT/ISA/210

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>1-8</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-8</u>
Industrial applicability (IA)	Yes: Claims	<u>1-8</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

- D1 WO 2016/115574 A1 (FOUNDATION PRODUCTIONS LLC [US]; FISHER JAMES MARK OAKLEY [US]) 21 July 2016 (2016-07-21)
- D2 WO 2016/120379 A1 (SICPA HOLDING SA [CH]) 4 August 2016 (2016-08-04)
- D3 Liane Cassavoy: "Find a Lost iPhone: Putting Tracking Apps to the Test | PCWorld",
, 21 June 2011 (2011-06-21), XP055591530,
Retrieved from the Internet:
URL:https://www.pcworld.com/article/230846/find_a_lost_iphone_putting_tracking_apps_to_the_test.html
[retrieved on 2019-05-23]
- D4 US 2015/288604 A1 (BOUDREAUX JOHN [US]) 8 October 2015 (2015-10-08)

2 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of at least **claim 1** is not new in the sense of **Article 33(2) PCT**.

2.1 **Claim 1:**

Document **D1** discloses all the features of claim 1 (references in parentheses applying to document D1 and using the wording of this claim):

The inventive LPWAN-based land security system ("system and method for autonomous UAV operations" on page 1) is characterized by being comprised of;

Node unit (A) Sensors (A1) ("depicted UAVs may spend most of their time operating as pole-mounted security cameras ... Targets may be tracked by a variety of markers, such as visual recognition, pattern recognition, infra-red or ultra-violet signature, biometric characteristics (walk gait characteristics, face/iris recognition, etc.), or tags attached to the target such as tracking

transmitters, RFID tags, dye or DNA-infused spray (such as used by some security devices to tag an intruder or thief), radioactive dot or RFID chip on target, etc." on page 6),

External hardware interface (A2), External hardware (A3) ("UAV docked onto the user's helmet" on page 3. Docking port is the external hardware interface and the docked object is the external hardware.),

Flash memory (A4) for keeping the software and necessary records ("docking port may incorporate its own data processing system to process light and optical depth mapping, imaging, location, orientation and other sensor data, flight, navigation, networking, docking, launching, charging, power transfer, induction, management, distribution and/or other operational data independent of and/or in coordination with the onboard data processing module of the UAV" on page 11. A data processing system by definition includes a memory device.),

RF communication unit providing communication in required frequencies for application by RF signal between 0-infinite km, preferably 5-50 km (A5) ("The docking ports may also incorporate their own wide area wireless communications module for cellular and/or satellite communications ... The docking ports may also incorporate multi-channel Radio Frequency (RF) ... modules" on page 10. Cellular communication has a range reaching 50 km.),

motion detector (A6), which can detect when the Node is moving ("the docking port of the UAV ... may also incorporate an accelerometer for measuring the motion and speed of the UAV" on page 10),

Processor (A7), which can digitally process the data of all incoming sensors ("docking port may incorporate its own data processing system to process light and optical depth mapping, imaging, location, orientation and other sensor data, flight, navigation, networking, docking, launching, charging, power transfer, induction, management, distribution and/or other operational data independent of and/or in coordination with the onboard data processing module of the UAV" on page 11),

Power supply or battery unit (A8) ("the docking port may have its own battery power supply independent of the UAV" on page 11),

GPS sensor (A9) which is used to know the location of the nodes ("The docking ports on both the UAV and docking station may also incorporate GPS modules for location positioning" on page 10).

The subject-matter of claim 1 is therefore not new (Article 33(2) PCT).

2.2 Dependent claims 2-8:

The additional features of all dependent claims do not add anything new or inventive to the independent claims, because these features are either known from the cited prior art (D1-D4) or common measures.

D1 additionally discloses in figures 22A-24 the different implementation scenarios of the sensor node in the military context and page 10 discloses the wireless sensor network established using the sensor nodes.

Re Item VII

Certain defects in the international application

3 The features of all claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

4 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1 is not mentioned in the description, nor are these documents identified therein.

Re Item VIII

Certain observations on the international application

5 The application does not meet the requirements of Article 6 PCT, because of the following reasons:

5.1 The expression "preferably 5-50 km" in claims 1 and 7 is regarded as an optional feature (Guidelines F-IV.4.9) and is therefore not limiting the scope of these claims.

5.2 The expression "LPWAN-based" in the preamble of all claims is not limiting as it is not defined how and where the LPWAN technology is used.

5.3 Claim 2 is not clear for the following reasons:

5.3.1 Claim 2 is dependent on claim 1, which defines a single sensor node. Therefore, it is not clear where the star topology should be applied. Furthermore, with the expression "Due to the star of the all star topology, it can be used in city conflicts" the claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

- 5.3.2 Similarly, with the expression "The asynchronous mac layer provides instant intelligence" the claim attempts to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result. Furthermore, the second paragraph of page 2 of the description is contradicting with this statement.
- 5.3.3 A claim's subject-matter is normally defined in terms of positive features indicating that certain technical elements are present. Exceptionally, however, the subject-matter may be restricted using a negative limitation expressly stating that particular features are absent. This may be done e.g. if the absence of a feature can be deduced from the application as filed. Negative limitations such as disclaimers may be used only if adding positive features to the claim either would not define more clearly and concisely the subject-matter still protectable or would unduly limit the scope of the claim. (Guidelines F-IV.4.20). However, this is not the case for the expression "Does not require the use of expensive sensors such as cameras etc.", which is therefore not allowed.
- 5.3.4 The ACK message or between which devices it should be implemented is not defined and thus these features are not clear.
- 5.3.5 The following features attempt to define the subject-matter of the claim in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result:
- 5.3.5.1 Due to the maximum range of 20-50 km, even if people try to pick up and steal the sensor, it can ask for help by sending its location signal until security units' reach it.
- 5.3.5.2 Movements of enemies can be followed in urban conflicts by leaving them in urban areas, (due to the star of the all star topology, the system is active if only one is active).
- 5.3.5.3 Software upgrades can be made later to the nodes that are left at various sites.
- 5.3.5.4 The operators that will be connected to the system must be able to take action without any intervention.
- 5.4 Claims 4-7 refer to features B-E, which are solely defined in claim 3, however they are directly dependent on claim 1.

- 5.4.1 The following features attempt to define the subject-matter of claim 8 in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result:
- 5.4.1.1 Sensor fusion algorithms can be developed to make the received data more meaningful
- 5.4.1.2 reduce the unit costs with cheaper sensors.
- 5.4.2 Overall, the claims are difficult to clearly understand due to grammatical and typological errors.