APPARATUS AND METHOD OF CONTROLLING AN UNMANNED VEHICLE

Abstract: In one or more embodiments, an apparatus and method for operating an unmanned and autonomous vehicle includes a sensor management module configured to direct sensors to what function they are to provide; a mission management module configured to provide execute function capabilities; an effects management module configured to provide launching and directing weapons to their target capabilities; a vehicle management module; a situation awareness management module configured to provide correlate sensor data of objects, threats, targets, geographic points of interest that the pilot requires to make decisions in the immediate environment; a communications management module; an information management module configured to provide a database of intelligence-related data; a middleware module configured to interface with the sensor management module, the mission management module, the effects management module, the vehicle management module, the situation awareness management module, the communications management module, and the information management module.
Published: 2010/039306

<table>
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<th>(88)</th>
<th>Date of publication of the international search report:</th>
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— 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))
## INTERNATIONAL SEARCH REPORT

**International application No**

PCT/US2009/048832

### A. CLASSIFICATION OF SUBJECT MATTER

**INV.** G05D1/00

**ADD.**

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)

G05D

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

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

EPO-Internal

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>X</td>
<td>US 6 122 572 A (YAVNAI ARI E [IL]) 19 September 2000 (2000-09-19) the whole document</td>
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<td>X</td>
<td>US 2004/030451 AI (SOLOMON NEAL [US]) 12 February 2004 (2004-02-12) paragraphs [0062], [0151], [0156], [0164], [0195], [0201], [0202], [0207], paragraphs [0213], [0214], [0220], [0226], [0282], [0283], [0285], [0286], [0290], [0293], [0294] claims 1,2</td>
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**X** Further documents are listed in the continuation of Box C.  

**X** 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 document but published on or after the international filing date
  
  "L" 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
  
  "P" later document published prior to the international filing date but later than the priority date claimed
  
  "O" document referring to an oral disclosure, use, exhibition or other means
  
  "Q" document published prior to the international filing date but later than the priority date claimed
  
  "R" 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)
  
  "S" document defining particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  
  "T" document defining particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
  
  "V" 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
  
  "X" document member of the same patent family

**Date of the actual completion of the international search**

17 May 2011

**Date of mailing of the international search report**

30/05/2011

**Name and mailing address of the ISA**

European Patent Office, P.B. 5818 Patentlaan 2

NL-2280 HV Rijswijk

Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016

**Authorized officer**

Westholm, Mats
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<td>US 2004/030448 A1 (SOLOMON NEAL [US]) 12 February 2004 (2004-02-12) paragraphs [0062], [0151], [0156], [0164], [0195], [0201], [0202], [0207] paragraphs [0213], [0214], [0220], [0226], [0282], [0283], [0285], [0286], [0290], [0293], [0294]</td>
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INTERNATIONAL SEARCH REPORT

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.:
   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:

   see additional sheet

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 an 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.:
   1, 14-28

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.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claim: 1

   an apparatus for operating an unmanned and autonomous vehicle, comprising seven management modules interfaced with a middleware module, whereby an information management module is configured to provide a database of intelligence-related data;

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2. Claims: 2-13

   an element configured to transmit commands to an unmanned and autonomous vehicle configured to perform intelligence.

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3. Claims: 14-19

   an unmanned and autonomous vehicle configured to perform intelligence whereby the vehicle is configured to receive commands, and adapt, re-task and re-plan a pre-planned mission plan.

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   A method comprising:
   providing a pre-planned mission plan to an unmanned and autonomous vehicle;
   receiving updated information;
   update the pre-planned mission plan;
   transmitting the updated mission plan; and
   performing operations on a target.

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