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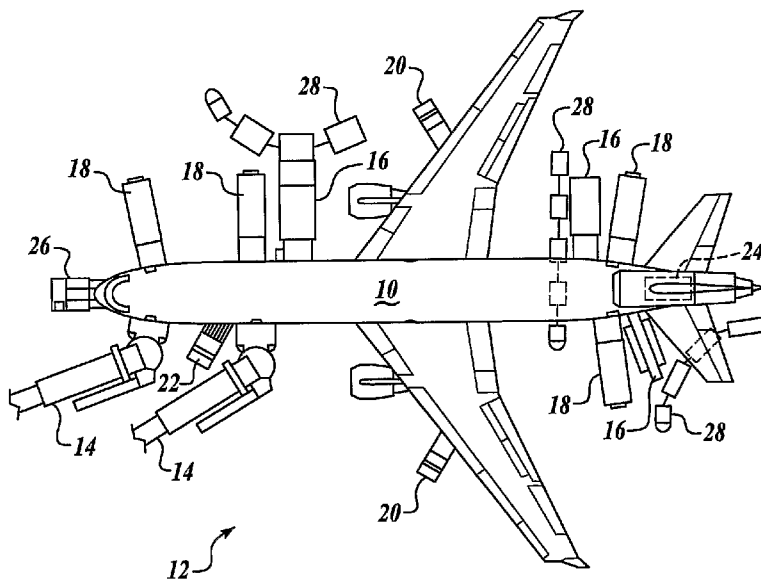
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- (21) International Application Number: PCT/US2005/033321 (74) Agents: **WOO, Euclid** et al.; The Boeing Company, MC 110-SD54, P.O. Box 2515, Seal Beach, CA 90740-1515 (US).
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- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: GROUND VEHICLE COLLISION PREVENTION SYSTEMS AND METHODS



(57) Abstract: The present invention comprises systems and methods for preventing collisions between aircraft and ground vehicles. In one embodiment, a system includes a proximity detection unit and a transducer proximate to a selected structural portion of an aircraft, the proximity detection unit being operable to emit ranging signals through the transducer and to receive reflected signals through the transducer to determine the position of an object within a ranging area adjacent to the structural portion. The system further includes an alarm device coupled to the proximity detection unit that is responsive to a signal generated by the proximity detection unit. In another embodiment, a method includes determining a distance between the ground service vehicle and a selected structural portion of the aircraft when the vehicle is positioned in a ranging area about the aircraft. The method further includes generating a proximity alarm based upon the distance.

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3 May 2007

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2005/033321

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. G01S13/93

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)  
G01S B60Q G08G

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, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.              |
|-----------|--|------------------------------------|
| X         | US 6 246 320 B1 (MONROE DAVID A [US])<br>12 June 2001 (2001-06-12)   | 1-8,<br>33-38,<br>42-49,<br>53-61  |
| Y         | column 3, line 60 - line 66<br><br>column 5, line 37 - line 40<br>column 17, line 36 - line 51<br>column 20, line 64 - column 21, line 37<br>----- | 9-16,<br>39-41,<br>50-52,<br>62-64 |
| Y         | US 3 360 775 A (SCHROEDER EDWARD W)<br>26 December 1967 (1967-12-26)<br><br>figure 1<br>column 4, line 3 - line 19<br>-----                        | 9-16,<br>39-41,<br>50-52,<br>62-64 |

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 document 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

9 November 2006

Date of mailing of the international search report

25.01.2007

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2005/033321

## Box 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 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 fee, this Authority did not invite payment of any additional fee.
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.:

1-16, 33-64

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-16,33-64

Ground surveillance

1.1. claims: 1-11,42-64

Alarm zones

1.2. claims: 12-16

System redundancy

1.3. claims: 33-41

GPS distance  
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2. claims: 17-25,65

Remote vehicle control  
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3. claims: 26-32

Vehicle geometry  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No  
PCT/US2005/033321

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|--|------------------|-------------------------|------------------|
| US 6246320                             | BI               | 12-06-2001              | NONE             |
| US 3360775                             | A                | 26-12-1967              | NONE             |