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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Published:

— with international search report (Art. 21(3))

[Continued on next page]

(54) Title: METHODS AND APPARATUS FOR MONITORING COMPLEX FLOW FIELDS FOR WIND TURBINE APPLICATIONS

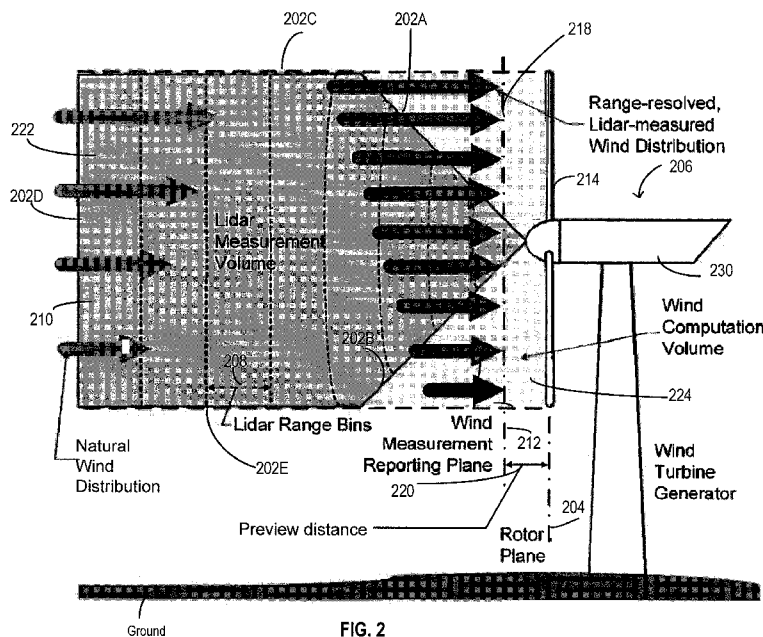
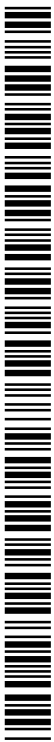


FIG. 2

(57) Abstract: A method is provided for generating range-resolved wind data near a wind turbine generator coupled to a control system. The method includes measuring wind flow data in a first long range region at a distance from a rotor plane of the wind turbine generator with a laser radar. The method also includes calculating wind fields in a second short range region and blade-specific wind fields for the at least one rotating blade based upon the measured wind flow data, the second short range region being generally closer to the rotor plane of the wind turbine generator than the first long range region. The method further includes generating range-resolved wind data. A system is also provided for generating range-resolved wind data near a wind turbine generator. A non-transitory computer readable storage medium provides wind classification codes to a control system coupled to a wind turbine generator based upon range-resolved wind fields.



— *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:**  
11 October 2012

**INTERNATIONAL SEARCH REPORT**

International application No PCT/US2012/020957
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**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. G01W1/00 F03D7/00 G01P5/26 G01S17/95  
 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)  
 G01W F03D G01P G01S  
 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 practicable, 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	EP 1 460 266 A2 (MITSUBISHI ELECTRIC CORP [JP]) 22 September 2004 (2004-09-22)	1-27
A	abstract; figure 1 paragraphs [0038] - [0047]	28-31
A	EP 2 025 929 A2 (GEN ELECTRIC [US]) 18 February 2009 (2009-02-18) paragraphs [0006] - [0008], [0021] - [0029]	1-31
X	JP 2006 125265 A (TOKYO ELECTRIC POWER CO) 18 May 2006 (2006-05-18) abstract; figure 1 paragraphs [0019], [0020]	28-31
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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	"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
"E" earlier application or patent but published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  2 July 2012	Date of mailing of the international search report  21/08/2012
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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  de Bakker, Michiel
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INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2012/020957

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 10 2009 030886 A1 (BOSCH GMBH ROBERT [DE]) 30 December 2010 (2010-12-30) abstract; figures 1,2 paragraphs [0014] - [0016], [0035] - [0036] -----	28-31

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2012/020957

## 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.:
  
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.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-27

Generation of range resolved wind data

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2. claims: 28-31

Provision of wind classification codes to a wind turbine control system

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2012/020957
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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			WO 2011000453 A2 06-01-2011
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