



- (51) International Patent Classification:  
G01V 1/40 (2006.01) G01V 1/02 (2006.01)
- (21) International Application Number:  
PCT/US2012/034041
- (22) International Filing Date:  
18 April 2012 (18.04.2012)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
61/477,864 21 April 2011 (21.04.2011) US  
13/449,057 17 April 2012 (17.04.2012) US
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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.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

[Continued on next page]

(54) Title: SURFACE WAVE SENSOR FOR DOWNHOLE APPLICATIONS

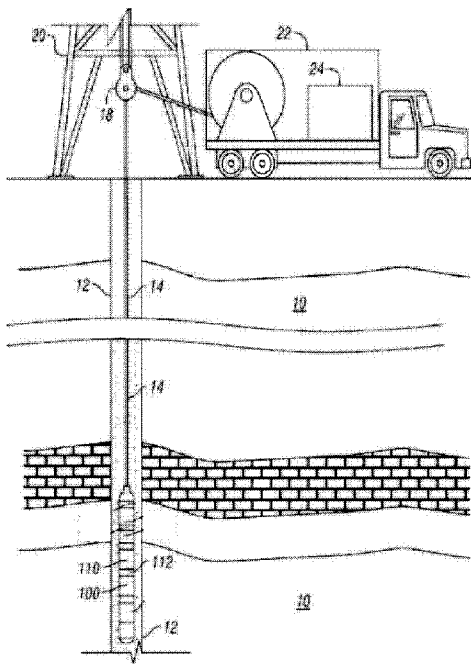


FIG. 1

(57) Abstract: The present disclosure relates to an apparatus and method for estimating a parameter of interest in a downhole fluid using a fluid analysis module. The fluid analysis module may include: a first transducer configured to generate a surface wave in a fluid. The first transducer may include one or more of: a piezoelectric crystal, an electromagnetic transducer, and a surface acoustic wave crystal. The apparatus may use the first transducer or a second transducer to generate a signal indicative of the dissipation of the surface wave in the fluid. The apparatus may include a compensator configured to reduce mechanical pressure on the transducer. The method may include estimating a parameter of interest of the fluid using a signal indicative of the dissipation of the surface wave.





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— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))* — *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))*

**Published:**

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

**(88) Date of publication of the international search report:**

31 January 2013

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2012/034041****A. CLASSIFICATION OF SUBJECT MATTER***G01V 1/40(2006.01)i, G01V 1/02(2006.01)i*

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)

G01V 1/40; G01V 3/00; G01V 1/28; G01V 11/00

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

Korean utility models and applications for utility models  
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; Keywords: transducer, dissipasion, fluid

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2008-0125974 A1 (DUBINSKY VLADIMIR et al.) 29 May 2008 See paragraphs 11-20, claims 1,3,5 and fig. 2.	1-22
A	US 2009-0105957 A1 (HSU CHAUR-JIAN et al.) 23 April 2009 See paragraphs 29,30,35,36,37 and fig. 1.	1-22
A	US 2009-0183941 A1 (PABON MIGUEL F. et al.) 23 July 2009 See paragraphs 40-48 and fig. 2.	1-22
A	US 2004-0133348 A1 (KOUROSH KALANTAR-ZADEH et al.) 08 July 2004 See paragraph 36, claims 1,3, and fig. 1.	1-22

 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

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"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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

27 NOVEMBER 2012 (27.11.2012)

Date of mailing of the international search report

**28 NOVEMBER 2012 (28.11.2012)**

Name and mailing address of the ISA/KR

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/034041**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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