



- (51) **International Patent Classification:**
G01V 1/38 (2006.01) **G01V 1/28** (2006.01)
G01V 1/36 (2006.01) **G01V 1/24** (2006.01)
- (21) **International Application Number:**
PCT/US2010/023694
- (22) **International Filing Date:**
10 February 2010 (10.02.2010)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
12/370,684 13 February 2009 (13.02.2009) 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, RO, RS, RU, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ,

[Continued on next page]

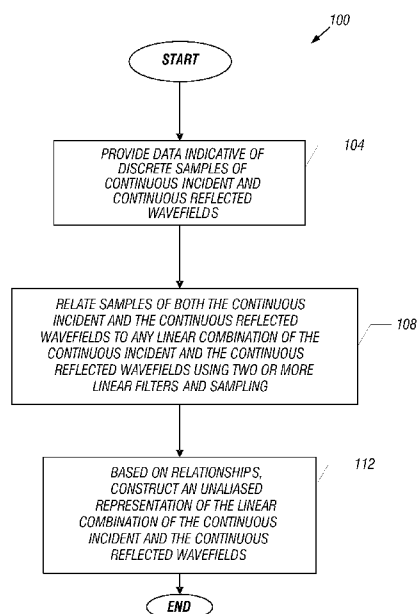
(54) **Title:** RECONSTRUCTING SEISMIC WAVEFIELDS

FIG. 3

(57) **Abstract:** A technique includes receiving seismic data acquired in a seismic survey in the vicinity of a reflecting interface. The survey has an associated undersampled direction. The technique includes providing second data indicative of discrete samples of incident and reflected components of a continuous seismic wavefield along the undersampled direction and relating the discrete samples to a linear combination of the continuous incident and reflected seismic wavefields using at least one linear filter. Based on the relationship, an unaliased representation of the linear combination of the continuous incident and reflected seismic wavefields is constructed.



TM), European (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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *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:

27 January 2011

Published:

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/023694**A. CLASSIFICATION OF SUBJECT MATTER***G01V 1/38(2006.01)i, G01V 1/36(2006.01)i, G01V 1/28(2006.01)i, G01V 1/24(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 1/38; G01V 1/30; G01V 1/24; G01V 3/00; G01V 1/28; G01V 1/36

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)

eKOMPASS(KIPO internal) "Keywords : sample, seismic, reconstruct, wavefield, undersample, unalias, combination and similar terms"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6556009 B2 (KELLMAN, P. & MCVEIGH, E.) 29 April 2003 See the whole document.	1-10
A	US 6801473 B2 (MATTEUCCI, G. et al.) 05 October 2004 See the whole document.	1-10
A	US 2008-0279043 A1 (SOUBARAS, R.) 13 November 2008 See the whole document.	1-10
A	US 5550786 A1 (ALLEN, K. P.) 27 August 1996 See the whole document.	1-10

☐ 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 application or patent 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 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

30 NOVEMBER 2010 (30.11.2010)

Date of mailing of the international search report

30 NOVEMBER 2010 (30.11.2010)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2010/023694**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.: 13-15
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:

Claims 13-15 are referring to claim 12. However claim 12 does not comply with PCT Rule 6.4(a) because the multiple dependent claims does not refer to other claims in the alternative way. Accordingly, claims 13-15 are unclear (PCT Article 6).
3. ☒ Claims Nos.: 11,12
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:

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.:

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/023694

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6556009 B2	29.04.2003	AU 2002-27276 A1 EP 1342098 A2 US 2002-0097050 A1 WO 02-48731 A2	24.06.2002 10.09.2003 25.07.2002 20.06.2002
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