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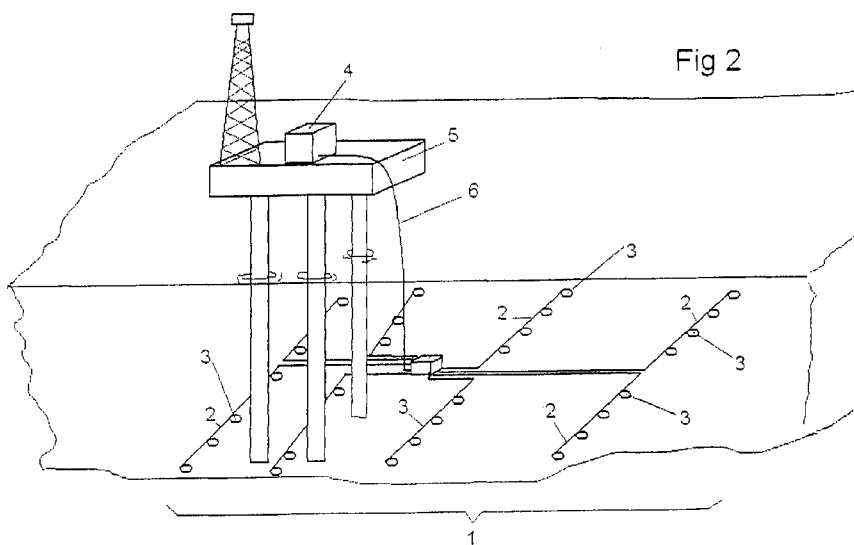
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DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
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- Published:**
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))
- (88) **Date of publication of the international search report:**
29 March 2012

(54) **Title:** SIGNAL PROCESSING



(57) **Abstract:** There is described a method and apparatus for processing light pulses returned from an optical sensor, wherein the light pulses are applied to two interferometer arrangements, a first interferometer arranged simply to superimpose two pulses and detect a first resulting value, and the other interferometer being arranged to apply a relative phase shift of about $n/2$ before superimposing the two pulses to detect a second resulting value. The relative phase shift is applied by shifting the phase of one or both of the pulses. The first and second resulting values are divided to give a third value, representative of the sensor state. A seismic sensor array using such an apparatus to process returning pulses is also described.

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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2010/001985

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01H9/00 G01V1/16
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)
G01H G01V G01B G01D

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, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2008/110780 A2 (QINETIQ LTD [GB]; CRICKMORE ROGER IAN [GB]; DE FREITAS JOLYON [GB]) 18 September 2008 (2008-09-18) page 1, line 3 - line 30 page 5, line 12 - line 34 page 9, line 20 - page 10, line 15 -----	1-33
A	WO 2009/007694 A1 (QINETIQ LTD [GB]; DEFREITAS JOLYON [GB]; CRICKMORE ROGER IAN [GB]) 15 January 2009 (2009-01-15) page 8, line 23 - page 10, line 31 -----	1-32
A	GB 2 454 359 A (OPTOPLAN AS [NO]) 6 May 2009 (2009-05-06) paragraphs [0046], [0054], [0075]; claim 1 -----	1-32

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 26 January 2012	Date of mailing of the international search report 09/02/2012
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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 Lorne, Benoît
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2010/001985

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.: 34-36
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:
see FURTHER INFORMATION sheet PCT/ISA/210

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:

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

Continuation of Box II.2

Claims Nos.: 34-36

The application does not meet the requirements of Article 6 PCT, because claims 34-36 are not clear. The term "substantially as herein described with reference to the figures" used in claims 34-36 is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.2), should the problems which led to the Article 17(2) declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2010/001985

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
WO 2008110780	A2	18-09-2008	CN 101636639 A	27-01-2010
			EP 2122305 A2	25-11-2009
			JP 2010521661 A	24-06-2010
			US 2010067018 A1	18-03-2010
			WO 2008110780 A2	18-09-2008

WO 2009007694	A1	15-01-2009	CN 101688793 A	31-03-2010
			EP 2165160 A1	24-03-2010
			JP 2010533292 A	21-10-2010
			US 2010177302 A1	15-07-2010
			WO 2009007694 A1	15-01-2009

GB 2454359	A	06-05-2009	NONE	
