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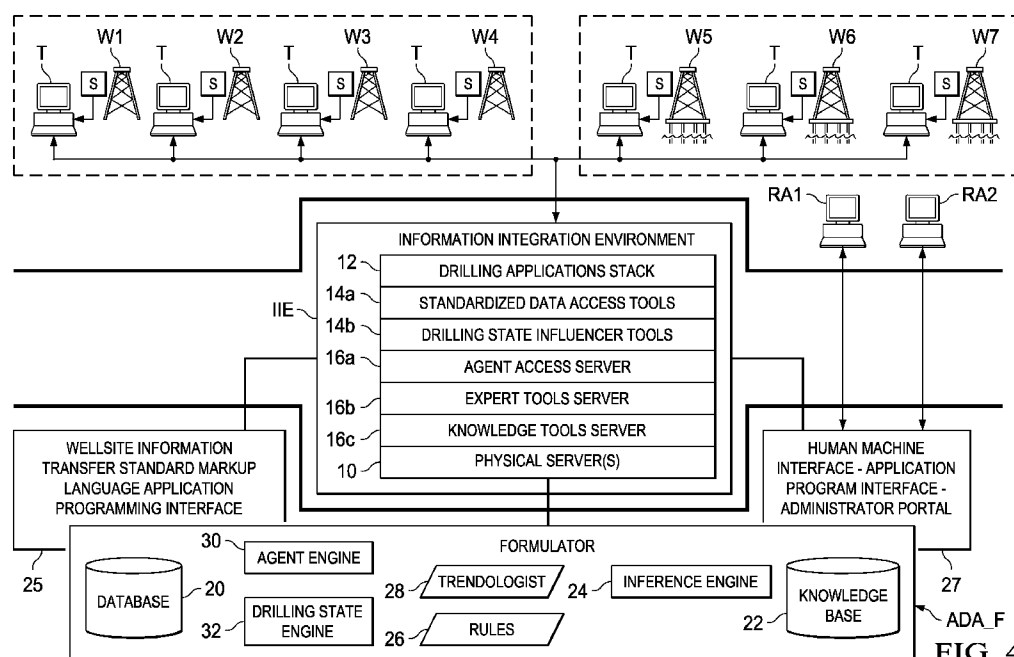
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[Continued on next page]

(54) Title: AN INTELLIGENT DRILLING ADVISOR



(57) Abstract: A method, apparatus, and program storage device for integrating an implementing rule-based, heuristic, wellbore key performance rate of penetratio indicators advising drilling operations personnel based on the situational awareness o trended earth properties and real time wellbore sensor data, is disclosed.



Declaration under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

Published:

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- (88) **Date of publication of the international search report:**
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/080849

A. CLASSIFICATION OF SUBJECT MATTER
 INV. E21B41/00 E21B44/00

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)
 E21B

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 408 953 B1 (GOLDMAN WILLIAM A [US] ET AL) 25 June 2002 (2002-06-25) column 4, line 7 - column 6, line 49	1-4
Y	the whole document	5-33
Y	US 6 021 377 A (DUBINSKY VLADIMIR [US] ET AL) 1 February 2000 (2000-02-01) column 6, line 10 - column 17, line 65	5-12
X	EP 1 653 044 A (WEATHERFORD LAMB [US]) 3 May 2006 (2006-05-03) column 3, paragraph 17 - column 7, paragraph 32; figure 1	38,62
Y	the whole document	13-17, 39-61, 63-81
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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
- *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.

G document member of the same patent family

Date of the actual completion of the international search

22 April 2009

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06/05/2009

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2008/080849

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2007/061081 A1 (MORAN DAVID P [US]) 15 March 2007 (2007-03-15) column 4, paragraph 44 - column 5, paragraph 66	18-33, 39-61, 63-81
X	US 2003/168257 A1 (ALDRED WALTER D [GB] ET AL) 11 September 2003 (2003-09-11) page 2, paragraph 23 - page 5, paragraph 56; figure 3	1,34-37
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A	US 2002/120401 A1 (MACDONALD ROBERT P [US] ET AL MACDONALD ROBERT P [US] ET AL) 29 August 2002 (2002-08-29) the whole document	1-12
A	US 6 405 135 B1 (ADRIANY JOHN J [US] ET AL) 11 June 2002 (2002-06-11) column 4, line 63 - column 6, line 36	13-17
A	US 2007/179768 A1 (CULLICK ALVIN S [US] ET AL) 2 August 2007 (2007-08-02) page 2, paragraph 13 - paragraph 16; figure 1	13-17
A	US 2004/256152 A1 (DASHEVSKIY DMITRIY [DE] ET AL) 23 December 2004 (2004-12-23) page 5, paragraph 55 - paragraph 58	13-17
A	US 2004/243309 A1 (ALFT KEVIN L [US] ET AL) 2 December 2004 (2004-12-02) the whole document	18-33
A	US 2005/149306 A1 (KING WILLIAM W [US]) 7 July 2005 (2005-07-07) the whole document	38-61
A	WO 99/60247 A (BAKER HUGHES INC [US]) 25 November 1999 (1999-11-25) the whole document	1,38,61
A	US 6 662 110 B1 (BARGACH SAAD [GB] ET AL) 9 December 2003 (2003-12-09) the whole document	1,38,61
A	EP 1 637 695 A (WEATHERFORD LAMB [US]; LONGBOTTOM JAMES [US]) 22 March 2006 (2006-03-22) the whole document	13-17, 38,61

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/080849

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 allsearchable 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 reportcovers 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: 1-12

Method of intelligently assisting the drilling of a borehole at a drilling site by forwarding signals related to drilling, selecting and executing at least one software agent to provide a drilling parameter and a recommendation and displaying said recommendation at the drilling site.

2. claims: 13-17,38-81

Method of intelligently assisting the drilling of a borehole at a drilling site by executing a software agent at the drilling site for forwarding to a server and receiving another selected software agent at the drilling site.

3. claims: 18-23

Method of intelligently assisting the drilling of a borehole at a drilling site by accessing one or more of data base of sensed physical measurements, well properties, drilling hardware types and of previously generated formulations.

4. claims: 24-33

Method of intelligently assisting the drilling of a borehole at a drilling site and providing a best well ontology comprising formulations of steps to be taken to drill a best well in response to drilling site parameters.

5. claims: 34-37

Method of intelligently assisting the drilling of a borehole at a drilling site whereby the software agent detects the presence of a loss of circulation event from received signals.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/080849

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