



- (51) **International Patent Classification:**  
*G01V 1/40* (2006.01)     *G01V 3/18* (2006.01)
- (21) **International Application Number:**  
PCT/US2012/044624
- (22) **International Filing Date:**  
28 June 2012 (28.06.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (71) **Applicant (for all designated States except US):** HAL-LIBURTON ENERGY SERVICES, INC. [US/US]; 10200 Bellaire Blvd., Houston, Texas 77072 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** WU, Hsu-Hsiang [—/US]; 6007 Parkwood Place, Sugar Land, Texas 77479 (US). SANMARTIN, Luis [US/US]; 7676 Phoenix Drive Apt. 1315, Houston, Texas 77030 (US).
- (74) **Agents:** MADDEN, Robert, B. et al.; Schwegman, Lundberg & Woessner, P.A., P.O. Box 2938, Minneapolis, Minnesota 55402 (US).
- (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, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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:**

— of inventorship (Rule 4.17(iv))

**Published:**

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

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

8 May 2014

(54) **Title:** MEASUREMENT CALIBRATION APPARATUS, METHODS, AND SYSTEMS

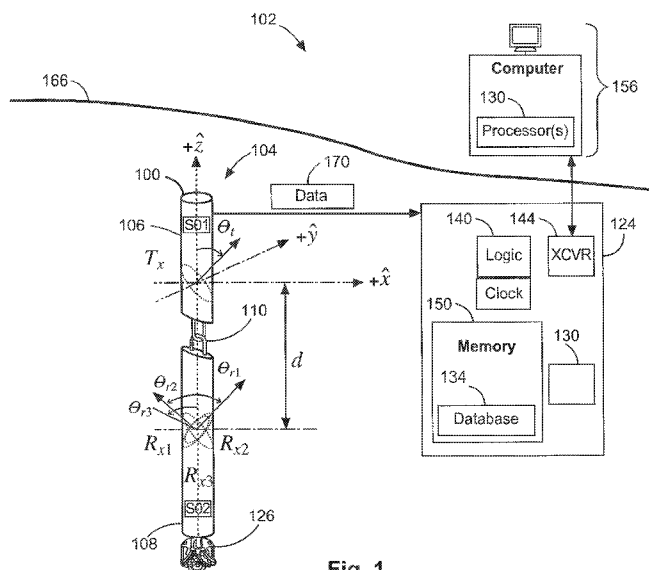


Fig. 1

(57) **Abstract:** In some embodiments, an apparatus and a system, as well as a method and an article, may operate to determine spatial orientations of one or more transmitters attached to a first downhole component, relative to one or more receivers attached to a second downhole component, at common points in time during rotation of the first and the second downhole components. The first downhole component may be variably, rotationally coupled to the second downhole component. Further activity may include transforming raw measurements of transmitter signals provided by the receiver(s) into calibrated measurements based on the spatial orientations at the common points in time. Additional apparatus, systems, and methods are described.



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/44624

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G01V 1/40, G01V 3/18 (2012.01)

USPC - 702/6

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)

USPC: 702/6

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

USPC: 702/1, 2, 6, 127, 155, 189; 73/1.01

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

PubWEST(PGPB, USPT, EPAB, JPAB); Google Scholar

Search Terms Used: mwd compensate tilted antenna electromagnetic coupling sensor speed velocity rotation steer synch synchronization clock twd downhole wireline calibration condition sensor

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2009/0309600 A1 (SEYDOUX et al.) 17 December 2009 (17.12.2009), Fig 2, para [0023], [0027], [0029]-[0031], [0040]	1-20
Y	US 2003/0076107 A1 (FANINI et al.) 24 April 2003 (24.04.2003), para [0019], [0083], [0147], [0149]	1-20
Y	US 2004/0073371 A1 (HAUGLAND) 15 April 2004 (15.04.2004), para [0186]	1-6, 14
Y	US 2003/0024305 A1 (IRELAND et al.) 06 February 2003 (06.02.2003), para [0036]	8, 13-14, 20
Y	US 2008/0137474 A1 (DASHEVSKIY et al.) 12 June 2008 (12.06.2008), para [0012], [0014]	12, 14

 Further documents are listed in the continuation of Box C.

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"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

15 August 2012 (15.08.2012)

Date of mailing of the international search report

17 SEP 2012

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents

P.O. Box 1450, Alexandria, Virginia 22313-1450

Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774