



(12) **United States Patent**
Suprun et al.

(10) **Patent No.:** **US 7,292,223 B2**
(45) **Date of Patent:** ***Nov. 6, 2007**

- (54) **LOCATION TRACKING DEVICE**
- (75) Inventors: **Anton E. Suprun**, Novosibirsk (RU);
Dmitri V. Simonenko, Potomac Falls,
VA (US)
- (73) Assignee: **Innalabs Technologies, Inc.**, Dulles,
VA (US)
- (*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 689 days.

This patent is subject to a terminal dis-
claimer.

- (21) Appl. No.: **10/836,624**
- (22) Filed: **May 3, 2004**

- (65) **Prior Publication Data**
US 2005/0001814 A1 Jan. 6, 2005

Related U.S. Application Data

- (63) Continuation-in-part of application No. 10/442,170,
filed on May 21, 2003, now Pat. No. 7,061,469, which
is a continuation-in-part of application No. 10/209,
197, filed on Aug. 1, 2002, now Pat. No. 6,731,268,
which is a continuation of application No. 09/511,
831, filed on Feb. 24, 2000, now Pat. No. 6,466,200.

- (51) **Int. Cl.**
G09G 5/00 (2006.01)
G01C 21/00 (2006.01)
- (52) **U.S. Cl.** **345/156**; 701/213; 701/215;
701/216; 342/357.06; 342/357.08; 342/357.12;
73/514.08
- (58) **Field of Classification Search** 345/156-169;
273/148 B; 463/37-38; 348/734; 73/514.01-514.08,
73/514.31; 701/79, 110, 213-216; 342/357.06,
342/357.07, 357.08, 357.12, 357.14

See application file for complete search history.

- (56) **References Cited**
U.S. PATENT DOCUMENTS
- 4,601,206 A 7/1986 Watson
- 4,984,463 A 1/1991 Idogaki et al.
- 5,181,181 A 1/1993 Glynn
- 5,774,113 A 6/1998 Barnes
- 5,831,553 A 11/1998 Lenssen et al.
- 5,835,077 A 11/1998 Dao et al.
- 5,856,802 A * 1/1999 Ura et al. 342/357.08

(Continued)

FOREIGN PATENT DOCUMENTS

- DE 3315958 A1 1/1984

(Continued)

OTHER PUBLICATIONS

- English Translation Abstract to RU 2201618 C2 (AL1).

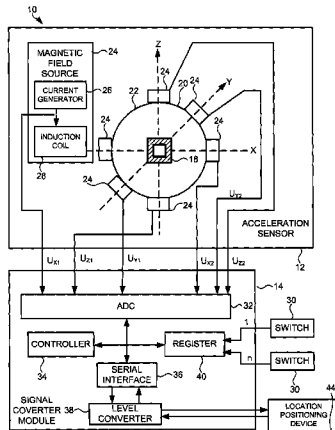
(Continued)

Primary Examiner—Lun-Yi Lao
(74) *Attorney, Agent, or Firm*—Bardmesser Law Group

(57) **ABSTRACT**

A location tracking device utilizing an acceleration sensor is described. The acceleration sensor includes an inertial body in magnetic fluid that is contained in a closed volume vessel. The tracking device may be used for tracking objects, people, animals, and the like. The tracking device may be utilized as a back-up system to a GPS system such that when signal from a GPS receiver are unavailable, the location tracking device may provide positional information about the location of the object.

19 Claims, 3 Drawing Sheets



U.S. PATENT DOCUMENTS

5,905,460	A *	5/1999	Odagiri et al.	342/357.06
5,982,169	A	11/1999	Furlani et al.	
6,002,184	A	12/1999	Delson et al.	
6,128,006	A	10/2000	Rosenberg et al.	
6,154,199	A	11/2000	Butler	
6,160,540	A *	12/2000	Fishkin et al.	345/184
6,369,794	B1	4/2002	Sakurai et al.	
6,466,200	B1	10/2002	Anton et al.	
6,501,458	B2	12/2002	Baker et al.	
6,509,888	B1	1/2003	Tuovinen et al.	
6,731,268	B2 *	5/2004	Anton et al.	345/163
6,820,002	B2 *	11/2004	Terada	701/207
6,924,764	B1 *	8/2005	Chen	342/357.07
6,985,134	B2 *	1/2006	Suprun et al.	345/163
7,061,469	B2 *	6/2006	Suprun et al.	345/158
2002/0003527	A1	1/2002	Baker et al.	
2002/0054011	A1	5/2002	Bruneau et al.	
2004/0095317	A1	5/2004	Zhang et al.	
2004/0140962	A1	7/2004	Wang et al.	345/179

FOREIGN PATENT DOCUMENTS

JP	62-163972	7/1987
JP	02-205775	8/1990
JP	04-344467	12/1992
JP	06-344467	12/1992
JP	06-213921	8/1994
RU	2168201 C1	11/1999
RU	2166203 C1	1/2000
RU	2173882 C1	3/2000
RU	2201618 C2	3/2001

OTHER PUBLICATIONS

English Translation Abstract to RU 2173882 C1 (AM1).
 English Translation Abstract to RU 2166203 C1 (AN1).

English Translation Abstract to RU 2168201 C1 (AO1).

"IEEE Recommended Practice for Precision Centrifuge Testing of Linear Accelerometers", IEEE Standards 836-2001, The Institute of Electrical and Electronics Engineers, Inc., Nov. 7, 2001, pp. i-86.

"IEEE Specification Format Guide and Test Procedure for Two-Degree-of-Freedom Dynamically Tuned Gyros", ANS/IEEE Std 813-1988, The Institute of Electrical and Electronic Engineers, Inc., 1989, pp. i-91.

Bashtovoi, V.G. et al. "Introduction to Thermomechanics of Magnetic Liquids", High Temperature Institute of the Academy of Sciences of the USSR, Moscow, 1985 (partial translation of p. 13).

"IEEE Standard Specification Format Guide and Test Procedure for Nongyroscopic Inertial Angular Sensors: Jerk, Acceleration, Velocity, and Displacement", IEEE Std 671-1985 (R2003), The Institute of Electrical and Electronics Engineers, Inc., 1985, pp. iii-69.

English Translation Abstract for DE 3315958 A1, 1 page, supplied from the esp@cenet database.

Notification Of Transmittal Of The International Search Report And The Written Opinion Of The International Searching Authority, Or The Declaration, from PCT Application No. PCT/US04/15924, 8 pages, mailed Dec. 9, 2004.

Computer Internet Website, Magellan 3D Controller (also known as Space Mouse), by Logitech, a Logitech Company, address "http://www.qualixdirect.com/html/magellan.html", 2 pages.

Computer Internet Website, "Logitech 3D Mouse Logitech Head Tracker", by Fakespace, Inc., address "http://www.qualixdirect.com/html3d_mouse_and_head_tracker.html", 2 pages.

Computer Internet Website, "The Spaceball 3D Controller", by Spacetec IMC Corporation, address "http://www.qualixdirect.com/html/spaceball.html", 3 pages.

* cited by examiner

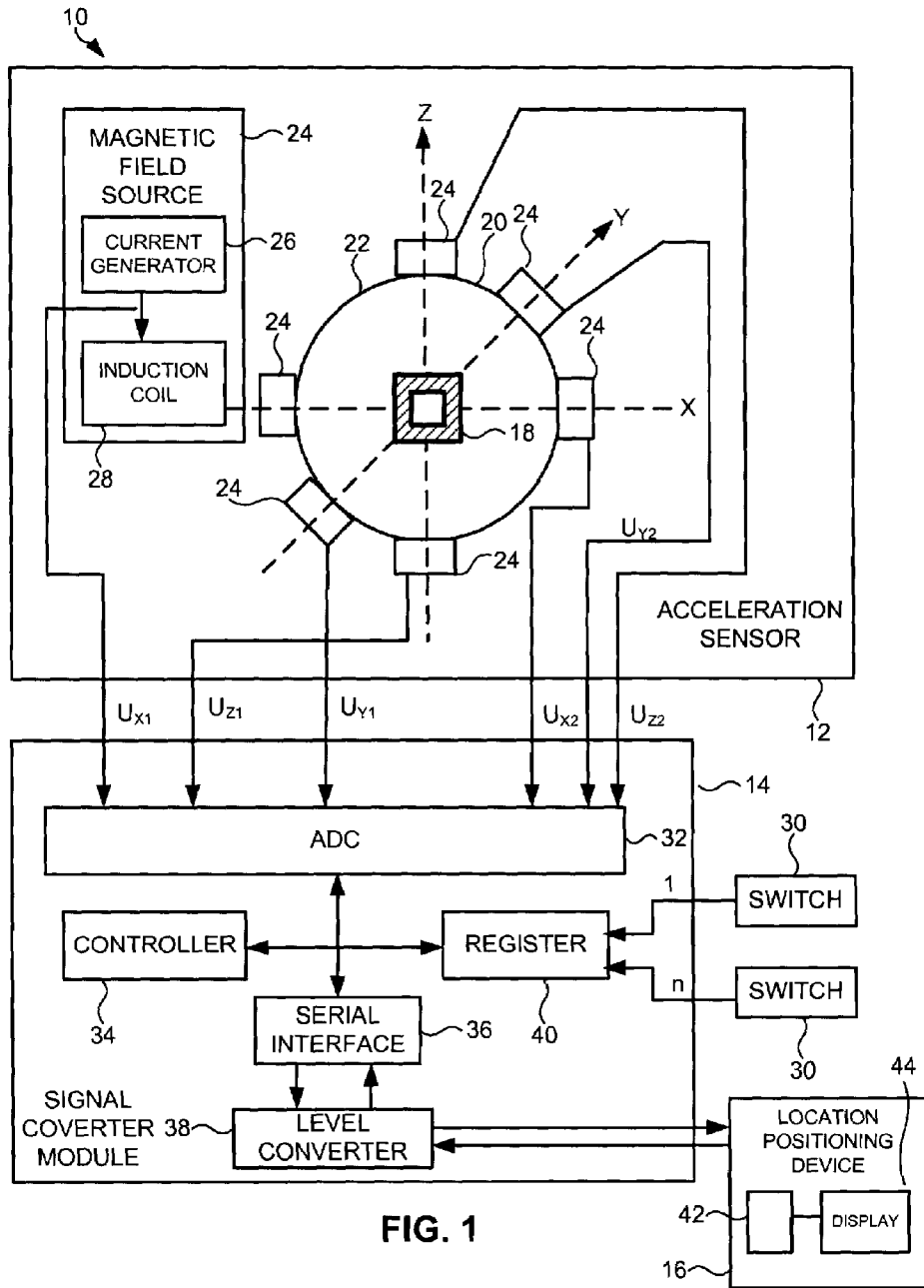


FIG. 1

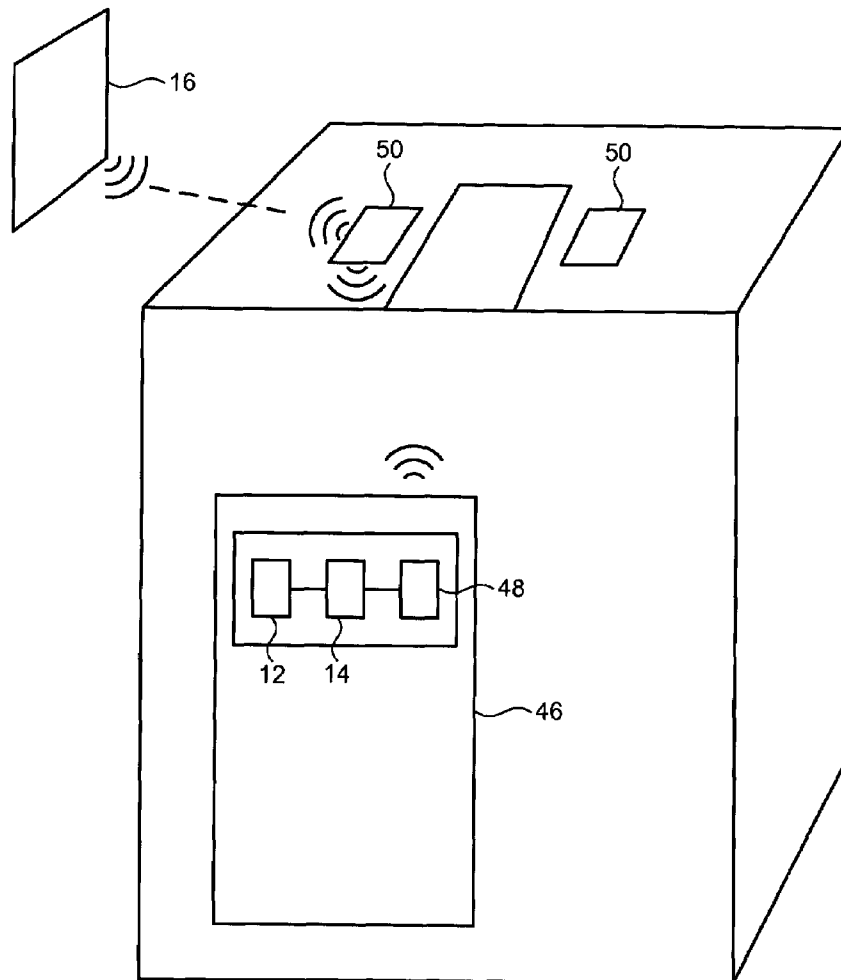


FIG. 2

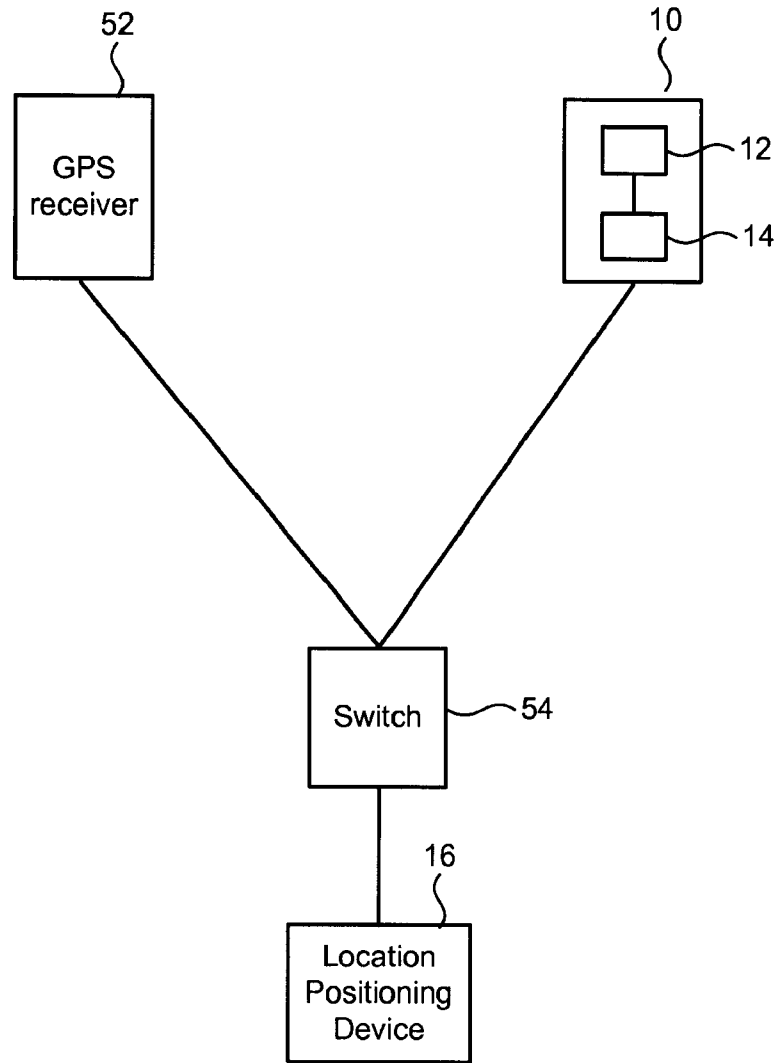


FIG. 3

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.