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(12) **United States Patent**
Thomas

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(54) **METHOD AND SYSTEM FOR AUTHORIZING LOCATION MONITORING**

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H04M 1/00 (2006.01)

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USPC **455/456.1**; 455/404.2; 455/414.2

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USPC 455/456.1, 404.2, 414.2
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,719,920	A	1/1988	Alt et al.
5,337,579	A	8/1994	Saia, III et al.
5,347,274	A	9/1994	Hassett
5,389,934	A	2/1995	Kass
5,400,020	A	3/1995	Jones et al.
5,461,365	A	10/1995	Schlager et al.
5,491,486	A	2/1996	Welles, II et al.
5,512,902	A	4/1996	Guthrie et al.
5,515,858	A	5/1996	Myllymaki
5,528,247	A	6/1996	Nonami
5,528,518	A	6/1996	Bradshaw et al.
5,532,690	A	7/1996	Hertel
5,539,748	A	7/1996	Raith
5,541,845	A	7/1996	Klein
5,550,551	A	8/1996	Alesio
5,568,119	A	10/1996	Schipper et al.
5,570,412	A	10/1996	LeBlanc
5,576,716	A	11/1996	Sadler
5,592,173	A	1/1997	Lau et al.
5,598,460	A	1/1997	Tendler

(Continued)

FOREIGN PATENT DOCUMENTS

EP	0 874 529 A2	10/1998
EP	1 037 447 A2	9/2000

(Continued)

OTHER PUBLICATIONS

Office Action for U.S. Appl. No. 12/150,126, dated Jul. 21, 2009.

(Continued)

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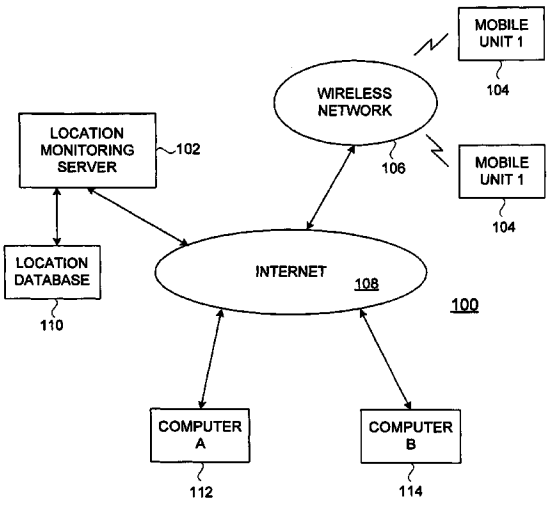
(57) **ABSTRACT**

Techniques for location tracking, location utilization, and dissemination and management of location information are disclosed. As a location monitoring system, one embodiment includes at least a plurality of mobile computing devices supported by a wireless network, and a computing device coupled to a wired network (e.g., the Internet) that couples to the wireless network. Each of the mobile computing devices is associated with and proximate to an object whose location is being monitored. The computing device stores the locations of each of the mobile computing devices or the objects proximate thereto, and enables only authorized users to obtain access the locations via the wired network.

29 Claims, 8 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

5,604,708	A	2/1997	Helms et al.	
5,623,260	A	4/1997	Jones	
5,623,418	A	4/1997	Rostoker	
5,629,678	A	5/1997	Gargano et al.	
5,633,874	A	5/1997	Diachina et al.	
5,650,770	A	7/1997	Schlager et al.	
5,652,570	A	7/1997	Lepkofker	
5,673,692	A	10/1997	Schulze et al.	
5,686,888	A	11/1997	Welles, II et al.	
5,710,551	A	1/1998	Ridgeway	
5,712,619	A	1/1998	Simkin	
5,731,757	A	3/1998	Layson, Jr.	
5,731,788	A	3/1998	Reeds	
5,742,233	A	4/1998	Hoffman et al.	
5,751,245	A	5/1998	Janky et al.	
5,771,001	A	6/1998	Cobb	
5,771,455	A	6/1998	Kennedy, III et al.	
5,774,876	A	6/1998	Woolley et al.	
5,797,091	A	8/1998	Clise et al.	
5,808,565	A	9/1998	Matta et al.	
RE35,920	E	10/1998	Sorden et al.	
5,825,283	A	10/1998	Camhi	
5,826,195	A	10/1998	Westerlage et al.	
5,835,907	A	11/1998	Newman	
5,841,352	A	11/1998	Prakash	
5,844,862	A	12/1998	Cocatre-Zilgien	
5,850,196	A	12/1998	Mowers	
5,861,841	A	1/1999	Gildea et al.	
5,883,594	A	3/1999	Lau	
5,889,770	A	3/1999	Jokiaho et al.	
5,892,454	A	4/1999	Schipper et al.	
5,905,461	A	5/1999	Neher	
5,910,799	A	6/1999	Carpenter et al.	
5,913,078	A	6/1999	Kimura et al.	
5,917,433	A	6/1999	Keillor et al.	
5,918,180	A	6/1999	Dimino	
5,938,721	A	8/1999	Dussell et al.	
5,948,040	A	9/1999	DeLorme et al.	
5,948,043	A	9/1999	Mathis	
5,959,575	A	9/1999	Abbott	
5,959,577	A	9/1999	Fan et al.	
5,963,130	A	10/1999	Schlager et al.	
5,970,388	A	10/1999	Will	
5,982,285	A	11/1999	Bueche et al.	
5,982,807	A	11/1999	Snell	
5,983,108	A	11/1999	Kennedy, III et al.	
5,991,690	A	11/1999	Murphy	
5,995,849	A	11/1999	Williams et al.	
6,002,363	A	12/1999	Krasner	
6,002,982	A	12/1999	Fry	
6,009,319	A	12/1999	Khullar et al.	
6,013,007	A	1/2000	Root et al.	
6,014,080	A	1/2000	Layson, Jr.	
6,014,090	A	1/2000	Rosen et al.	
6,023,241	A	2/2000	Clapper	
6,031,496	A	2/2000	Kuittinen	
6,032,051	A	2/2000	Hall et al.	
6,034,622	A	3/2000	Levine	
6,054,928	A	4/2000	Lemelson et al.	
6,064,336	A	5/2000	Krasner	
6,067,018	A	5/2000	Skelton et al.	
6,067,044	A	5/2000	Whelan et al.	
6,072,396	A	6/2000	Gaukel	
6,078,290	A	6/2000	McBurney et al.	
6,083,248	A	7/2000	Thompson	
6,083,353	A	7/2000	Alexander	
6,094,168	A	7/2000	Duffett-Smith et al.	
6,100,806	A	8/2000	Gaukel	
6,101,710	A	8/2000	Selinger	
6,111,540	A	8/2000	Krasner	
6,115,595	A	9/2000	Rodal et al.	
6,121,921	A	9/2000	Ishigaki	
6,131,067	A	10/2000	Girerd et al.	
6,140,863	A	10/2000	Fujisawa	
6,141,570	A	10/2000	O'Neill, Jr. et al.	
6,144,303	A	11/2000	Federman	
6,148,280	A	11/2000	Kramer	
6,154,422	A	11/2000	Shinkawa et al.	
6,163,696	A	12/2000	Bi et al.	
6,171,264	B1	1/2001	Bader	
6,172,640	B1	1/2001	Durst et al.	
6,175,616	B1	1/2001	Light et al.	
6,198,390	B1	3/2001	Schlager et al.	
6,198,431	B1	3/2001	Gibson	
6,198,930	B1	3/2001	Schipper	
6,199,045	B1	3/2001	Giniger et al.	
6,212,133	B1	4/2001	McCoy et al.	
6,226,622	B1	5/2001	Dabbiere	
6,231,519	B1	5/2001	Blants et al.	
6,232,916	B1	5/2001	Grillo et al.	
6,236,358	B1	5/2001	Durst et al.	
6,238,337	B1	5/2001	Kambhatla et al.	
6,243,039	B1 *	6/2001	Elliot	342/457
6,243,660	B1	6/2001	Hsu et al.	
6,246,376	B1	6/2001	Bork et al.	
6,252,543	B1	6/2001	Camp	
6,259,944	B1	7/2001	Margulis et al.	
6,263,280	B1	7/2001	Stingone, Jr.	
6,278,936	B1	8/2001	Jones	
6,281,797	B1	8/2001	Forster	
6,282,362	B1	8/2001	Murphy et al.	
6,282,495	B1	8/2001	Kirkhart et al.	
6,292,687	B1	9/2001	Lowell et al.	
6,298,306	B1	10/2001	Suarez et al.	
6,300,875	B1	10/2001	Schafer	
6,302,844	B1	10/2001	Walker et al.	
6,304,467	B1	10/2001	Nebrigic	
6,314,308	B1	11/2001	Sheynblat et al.	
6,317,049	B1	11/2001	Toubia et al.	
6,323,807	B1	11/2001	Golding et al.	
6,324,213	B1	11/2001	Harrison	
6,327,533	B1	12/2001	Chou	
6,331,817	B1	12/2001	Goldberg	
6,339,397	B1	1/2002	Baker	
6,340,928	B1	1/2002	McCurdy	
6,342,847	B1	1/2002	Archuleta et al.	
6,349,257	B1	2/2002	Liu et al.	
6,353,390	B1	3/2002	Beri et al.	
6,353,798	B1	3/2002	Green et al.	
6,356,841	B1	3/2002	Hamrick et al.	
6,362,778	B2	3/2002	Neher	
6,363,254	B1	3/2002	Jones et al.	
6,363,323	B1	3/2002	Jones	
6,373,430	B1	4/2002	Beason et al.	
6,377,810	B1 *	4/2002	Geiger et al.	455/456.2
6,388,612	B1	5/2002	Neher	
6,393,346	B1	5/2002	Keith et al.	
6,404,352	B1	6/2002	Ichikawa et al.	
6,407,698	B1	6/2002	Ayed	
6,411,892	B1	6/2002	Van Diggelen	
6,411,899	B2	6/2002	Dussell et al.	
6,421,538	B1	7/2002	Byrne	
6,426,719	B1	7/2002	Nagareda et al.	
6,427,120	B1	7/2002	Garin et al.	
6,430,602	B1	8/2002	Kay et al.	
6,433,732	B1	8/2002	Dutta et al.	
6,434,396	B1	8/2002	Rune	
6,441,778	B1	8/2002	Durst et al.	
6,442,380	B1	8/2002	Mohindra	
6,442,391	B1 *	8/2002	Johansson et al.	455/456.2
6,443,890	B1	9/2002	Schulze et al.	
6,445,937	B1	9/2002	daSilva	
6,453,237	B1	9/2002	Fuchs et al.	
6,463,272	B1	10/2002	Wallace et al.	
6,466,821	B1	10/2002	Pianca et al.	
6,469,639	B2	10/2002	Tanenhaus et al.	
6,471,087	B1	10/2002	Shusterman	
6,478,736	B1	11/2002	Mault	
6,496,775	B2	12/2002	McDonald, Jr. et al.	
6,505,048	B1 *	1/2003	Moles et al.	455/456.1
6,505,049	B1	1/2003	Dorenbosch	
6,513,532	B2	2/2003	Mault et al.	
6,522,871	B1	2/2003	Patrick et al.	
6,522,889	B1	2/2003	Aarnio	

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,529,164	B1	3/2003	Carter	
6,544,193	B2	4/2003	Abreu	
6,552,652	B2	4/2003	Beken	
6,553,336	B1	4/2003	Johnson et al.	
6,559,620	B2	5/2003	Zhou et al.	
6,569,094	B2	5/2003	Suzuki et al.	
6,571,193	B1	5/2003	Unuma et al.	
6,579,231	B1	6/2003	Phipps	
6,579,844	B1	6/2003	Morrison et al.	
6,611,688	B1	8/2003	Raith	
6,625,437	B1 *	9/2003	Jampolsky et al.	455/405
6,630,885	B2	10/2003	Pyne et al.	
6,640,085	B1	10/2003	Chatzipetros et al.	
6,650,907	B1	11/2003	Kamperschroer et al.	
6,661,372	B1	12/2003	Girerd et al.	
6,665,534	B1	12/2003	Conklin et al.	
6,679,071	B1	1/2004	Storey et al.	
6,696,982	B2	2/2004	Yoshioka et al.	
6,714,791	B2	3/2004	Friedman	
6,721,542	B1	4/2004	Anttila et al.	
6,741,927	B2	5/2004	Jones	
6,747,675	B1	6/2004	Abbott et al.	
6,748,318	B1	6/2004	Jones	
6,788,766	B2	9/2004	Logan	
6,801,853	B2	10/2004	Workman	
6,804,606	B2	10/2004	Jones	
6,847,892	B2	1/2005	Zhou et al.	
6,856,804	B1	2/2005	Ciotta	
6,865,385	B1	3/2005	Kohda et al.	
6,937,900	B1	8/2005	Pianca et al.	
6,952,645	B1	10/2005	Jones	
6,975,941	B1	12/2005	Lau et al.	
6,980,826	B2	12/2005	Yamaguchi	
6,997,882	B1	2/2006	Parker et al.	
7,010,144	B1	3/2006	Davis et al.	
7,071,842	B1	7/2006	Brady, Jr.	
7,085,253	B2	8/2006	Yang	
7,110,773	B1	9/2006	Wallace et al.	
7,136,832	B2	11/2006	Li et al.	
7,187,278	B2	3/2007	Biffar	
7,212,829	B1	5/2007	Lau et al.	
7,218,938	B1	5/2007	Lau et al.	
7,253,731	B2	8/2007	Joao	
7,321,774	B1	1/2008	Lau et al.	
7,366,522	B2 *	4/2008	Thomas	455/456.1
7,403,972	B1	7/2008	Lau et al.	
7,482,920	B2	1/2009	Joao	
7,539,557	B2	5/2009	Yamauchi	
7,809,377	B1	10/2010	Lau et al.	
7,905,832	B1	3/2011	Lau et al.	
7,953,809	B2	5/2011	Lau et al.	
8,176,135	B2	5/2012	Lau et al.	
8,285,484	B1	10/2012	Lau et al.	
8,301,158	B1 *	10/2012	Thomas	455/456.1
8,447,822	B2	5/2013	Lau et al.	
8,611,920	B2	12/2013	Lau et al.	
8,620,343	B1	12/2013	Lau et al.	
2001/0006891	A1	7/2001	Cho	
2001/0020204	A1	9/2001	Runyon et al.	
2001/0027378	A1	10/2001	Tennison et al.	
2001/0027525	A1	10/2001	Gamlin	
2001/0028304	A1	10/2001	I'Anson et al.	
2001/0044299	A1	11/2001	Sandegren	
2001/0044332	A1	11/2001	Yamada et al.	
2001/0047125	A1	11/2001	Quy	
2001/0052849	A1	12/2001	Jones, Jr.	
2002/0000930	A1	1/2002	Crowson et al.	
2002/0016173	A1	2/2002	Hunzinger	
2002/0027507	A1	3/2002	Yarin et al.	
2002/0028988	A1	3/2002	Suzuki et al.	
2002/0036593	A1	3/2002	Ying	
2002/0038182	A1	3/2002	Wong et al.	
2002/0049742	A1	4/2002	Chan et al.	
2002/0050945	A1	5/2002	Tsukishima et al.	
2002/0057192	A1	5/2002	Eagleson et al.	
2002/0063622	A1	5/2002	Armstrong et al.	
2002/0071677	A1	6/2002	Sumanaweera	
2002/0077080	A1	6/2002	Greene	
2002/0087260	A1	7/2002	Hancock et al.	
2002/0087619	A1	7/2002	Tripathi	
2002/0094067	A1	7/2002	August	
2002/0111171	A1	8/2002	Boesch et al.	
2002/0111819	A1	8/2002	Li et al.	
2002/0115453	A1	8/2002	Poulin et al.	
2002/0116080	A1	8/2002	Birnbach et al.	
2002/0119770	A1	8/2002	Twitchell, Jr.	
2002/0119789	A1	8/2002	Friedman	
2002/0120475	A1	8/2002	Morimoto	
2002/0140081	A1	10/2002	Chou et al.	
2002/0173910	A1	11/2002	McCall et al.	
2002/0193121	A1	12/2002	Nowak et al.	
2003/0003943	A1	1/2003	Bajikar	
2003/0009410	A1	1/2003	Ramankutty et al.	
2003/0013445	A1	1/2003	Fujiwara et al.	
2003/0068605	A1	4/2003	Kullok et al.	
2003/0069759	A1	4/2003	Smith	
2003/0095540	A1	5/2003	Mulligan et al.	
2003/0151507	A1	8/2003	Andre et al.	
2003/0163287	A1	8/2003	Vock et al.	
2003/0204132	A1	10/2003	Suzuki et al.	
2004/0034470	A1	2/2004	Workman	
2004/0046637	A1	3/2004	Wesby Van Swaay	
2004/0114731	A1	6/2004	Gillett et al.	
2004/0117108	A1	6/2004	Nemeth	
2004/0233065	A1	11/2004	Freeman	
2005/0250440	A1	11/2005	Zhou et al.	
2006/0173444	A1	8/2006	Choy et al.	
2007/0156286	A1	7/2007	Yamauchi	
2008/0021645	A1	1/2008	Lau et al.	
2008/0261636	A1	10/2008	Lau et al.	
2009/0042540	A1	2/2009	Bodnar et al.	
2011/0022533	A1	1/2011	Lau et al.	
2011/0223884	A1	9/2011	Lau et al.	
2012/0220266	A1	8/2012	Lau et al.	
2013/0203388	A1	8/2013	Thomas	
2013/0297524	A1	11/2013	Lau et al.	

FOREIGN PATENT DOCUMENTS

EP	1 037 447	A3	10/2001
JP	11-64482		3/1999
JP	11-258325		9/1999
JP	11-289574		10/1999
JP	11-306491		11/1999
WO	WO 97/14054		4/1997
WO	WO 97/41654		11/1997
WO	WO 98/01769	A1	1/1998
WO	WO 98/16045		4/1998
WO	WO 98/40837		9/1998
WO	WO 00/51391		8/2000
WO	WO 01/50151	A1	7/2001
WO	WO 01/63318	A1	8/2001
WO	WO 01/75700	A2	10/2001
WO	WO 02/42979	A1	5/2002
WO	WO 02/084618	A1	10/2002
WO	WO 03/012720	A1	2/2003
WO	WO 01/45343	A2	6/2007

OTHER PUBLICATIONS

First Amended Complaint for Patent Infringement, EDTX, Case 1:10-cv-00547-RC, filed Sep. 24, 2010, pp. 1-29.

Complaint for Patent Infringement, NDCA, Case cv10-04755V HRL, filed Oct. 20, 2010, pp. 1-22, including Exhibit 17 (60 pgs.), Exhibit 27 (57 pgs.), and Exhibit 38 (54 pgs.) [total 193 pgs.].

Amended Complaint for Patent Infringement, NDCA, Case cv10-4755 JSW, filed Feb. 4, 2011, pp. 1-23.

Answer to Amended Complaint (AT&T), NDCA, Case No. cv10-4755 JSW, filed Feb. 18, 2011, pp. 1-15.

Answer to Amended Complaint (Sprint), NDCA, Case No. cv10-4755 JSW, filed Feb. 18, 2011, pp. 1-15.

Answer to Amended Complaint (Verizon), NDCA, Case No. cv10-4755 JSW, filed Feb. 18, 2011, pp. 1-22.

(56) **References Cited**

OTHER PUBLICATIONS

U.S. Appl. No. 13/831,493, filed Mar. 14, 2013.
Office Action for U.S. Appl. No. 13/831,493, dated Jun. 12, 2013.
"Carrier and end-user applications for wireless location systems," TruePosition, Inc., http://www.trueposition.com/spie_app.htm, downloaded, Jul. 30, 2000, pp. 1-7.
Danger Product Overview, Danger, Inc., date unknown, 5 pgs.
U.S. Appl. No. 12/150,126, filed Apr. 26, 2008.
"Danger—Products" and "Hiptop Communicator Brochure," Danger, Inc., downloaded Oct. 26, 2003: www.danger.com/products.php).
"Developing a GPSs for the Global Supply Chain," Aberdeen Group, Inc., Executive White Paper, Jun. 2002.
Notice of Allowance for U.S. Appl. No. 09/797,517, dated Jan. 14, 2008.
Notice of Allowance for U.S. Appl. No. 12/150,126, dated Apr. 14, 2010.
Notice of Allowance for U.S. Appl. No. 12/150,126, dated Apr. 27, 2011.
Office Action for U.S. Appl. No. 09/797,617, dated Jul. 31, 2003.
Office Action for U.S. Appl. No. 09/797,517, dated Jan. 28, 2004.
Office Action for U.S. Appl. No. 09/797,517, dated Jun. 4, 2004.
Office Action for U.S. Appl. No. 09/797,517, dated Feb. 18, 2005.
Office Action for U.S. Appl. No. 09/797,517, dated Sep. 12, 2005.
Advisory Action for U.S. Appl. No. 09/797,517, dated Dec. 16, 2005.
Advisory Action for U.S. Appl. No. 09/797,517, dated Mar. 20, 2006.
Office Action for U.S. Appl. No. 09/797,517, dated Jun. 5, 2006.
Office Action for U.S. Appl. No. 09/797,517, dated Dec. 20, 2006.
Office Action for U.S. Appl. No. 09/797,517, dated Jul. 17, 2007.
Office Action for U.S. Appl. No. 09/797,517, dated Oct. 11, 2007.
Office Action for U.S. Appl. No. 12/150,126, dated Jan. 13, 2009.
Office Action for U.S. Appl. No. 12/150,126, dated Jan. 25, 2010.
Culler et al., MICA: The Commercialization of Microsensor Motes, Sensors, vol. 19, No. 4 (Apr. 1, 2002).
Darabi et al., A 2.4-GHz CMOS Transceiver for Bluetooth, IEEE Journal of Solid-State Circuits, vol. 36, No. 12 (Dec. 2001).
J. Fraden, Handbook of Modern Sensors, Springer-Verlag (1996).
Grimes, Craig A., et al., Wireless Magnetoelastic Resonance Sensors: A Critical Review, Sensors (Jul. 23, 2002).
Helfenstein et al. Circuits and Systems for Wireless Communications, Kluwer Academic Publishers (2000).
Hill et al., System Architecture Directions for Networked Sensors, ACM/ASPLOS-IX (Nov. 2000).
Madou, Marc J., Fundamentals of Microfabrication, CRC Press (2002).
Mainwaring et al., Wireless Sensor Networks for Habitat Monitoring, ACM (Sep. 28, 2002).
Razavi, Behzad, RF Microelectronics, Prentice Hall (1998).
Rofougaran et al., A Single-Chip 900-MHz Spread-Spectrum Wireless Transceiver in 1-μm CMOS—Part II: Receiver Design, IEEE Journal of Solid-State Circuits, vol. 33, No. 4 (Apr. 1998).
Senturia, Stephen D., Microsystem Design, Kluwer Academic Publishers (2001).
Archived page entitled "Money-Back Guarantee Policy" from fedex.com, archived by the Internet Archive on Aug. 17, 2000.
Strom, Stephanie. "A Wild Sleigh Ride at Federal Express," The New York Times, Dec. 20, 1994.
Notice of Allowance for U.S. Appl. No. 12/150,126, dated Jul. 10, 2012.
Steyaert et al., "A 2-V CMOS Cellular Transceiver Front-End," *IEEE Journal of Solid-State Circuits*, vol. 25, No. 12, Dec. 2000, pp. 1895-1907.
Preliminary Claim Constructions and Supporting Evidence for U.S. Patent No. 7,366,522 Pursuant to Patent L.R. 4-2, NDCA, Case CV 10-04755 JSW, filed Jun. 3, 2011, pp. 1-29, including Exhibit A.
Defendants Invalidity Contentions, NDCA, Case 3:10-cv-04755-JSW, filed May 3, 2011, pp. 1-1249, including Exhibit A (60 pgs.), Exhibit B (59 pgs.), Exhibit C (27 pgs.), Exhibit D (26 pgs.), Exhibit E (35 pgs.), Exhibit F (40 pgs.), Exhibit G (31 pgs.), Exhibit H (34 pgs.), Exhibit I (43 pgs.), Exhibit J (44 pgs.), Exhibit K-1 (49 pgs.), Exhibit K-2 (54 pgs.), Exhibit L-1 (50 pgs.), Exhibit L-2 (57 pgs.), Exhibit M1 (45 pgs.), Exhibit M-2 (54 pgs.), Exhibit N-1 (35 pgs.), Exhibit N-2 (51 pgs.), Exhibit 0-1 (51 pgs.), Exhibit 0-2 (36 pgs.), Exhibit P-1 (40 pgs.), Exhibit P-2 (39 pgs.), Exhibit Q-1 (36 pgs.), Exhibit Q-2 (42 pgs.), Exhibit R-1 (40 pgs.), Exhibit R-2 (43 pgs.), Exhibit S-1 (44 pgs.), Exhibit S-2 (41 pgs.).
Cellco Partnership's Proposed Terms for Construction, NDCA, Case 3:10-cv-04755-JSW, filed May 13, 2011, pp. 1-4.
Cellco Partnership's Preliminary Claim Constructions, NDCA, Case 3:10-cv-04755-Jsw, filed Jun. 3, 2011, pp. 1-9.
Amended Final Joint Claim Construction Statement, NDCA, Case 3:10-cv-04755-Jsw, filed Sep. 13, 2011, pp. 1-34.
Defendant AT&T Mobility, LLC's and Spring Spectrum and Nextel Operations' Proposed Terms and Claim Elements for Construction, NDCA, Case 3:10-cv-04755-Jsw, filed May 13, 2011, pp. 1-4.
Defendant AT&T Mobility, LLC's and Sprint Spectrum and Nextel Operations' Exchange of Preliminary Claim Constructions and Extrinsic Evidence, NDCA, Case 3:10-cv-04755, filed Jun. 3, 2011, pp. 1-15.
Defendant AT&T Mobility LLC's, Sprint Spectrum LP's and Nextel Operations' Responsive Claim Construction Brief, NDCA, Case 3:10-cv-04755-Jsw, filed Sep. 2, 2011, pp. 1-210, including Exhibit 1 (13 pgs.), Exhibit 2 (15 pgs.), Exhibit 3 (16 pgs.), Exhibit 4 (14 pgs.), Exhibit 5 (13 pgs.), Exhibit 6 (15 pgs.), Exhibit 7 (12 pgs.), Exhibit 8 (5 pgs.), Exhibit 9 (9 pgs.), Exhibit 10 (2 pgs.), Exhibit 11 (12 pgs.), Exhibit 12 (13 pgs.), Exhibit 13 (12 pgs.), Exhibit 14 (3 pgs.), Exhibit 15 (3 pgs.), Exhibit 16 (4 pgs.).
Defendants' Objections to IpVenture's Claim Construction Reply Brief Evidence, NDCA, Case 3:10-cv-04755-JSW, filed Sep. 20, 2011, pp. 1-22.
Plaintiff IpVenture, Inc.'s Reply Claim Construction Brief, NDCA, Case 3:10-cv-04755-JSW, filed Sep. 13, 2011, pp. 1-36.
Plaintiff IpVenture, Inc.'s First Amended Responses to Defendant AT&T Mobility LLC's Second Set of Interrogatories to Plaintiff (No. 7), NDCA, Case 3:10-cv-04755 JSW, filed Aug. 29, 2011, pp. 1-8.
Plaintiff IpVenture, Inc.'s Answers to Defendant AT&T Mobility LLC's Third Set of Interrogatories to Plaintiff (No. 10), NDCA, Case 3:10-cv-04755 JSW, filed Aug. 12, 2011, pp. 1-15.
Plaintiff IpVenture, Inc.'s Answers to Defendant AT&T Mobility, LLC's Second Set of Interrogatories (Nos. 7-9), NDCA, Case 3:10-cv-04755 JSW, filed Jun. 7, 2011, pp. 1-10.
Plaintiff IpVenture, Inc.'s Responses to Defendant Cellco Partnership's First Set of Interrogatories (Nos. 1-14), NDCA, Case 3:10-cv-04755 JSW, filed Apr. 18, 2011, pp. 1-49.
Plaintiff IpVenture, Inc.'s Opening Claim Construction Brief, NDCA, Case No. C 10-04755 JSW, filed Aug. 12, 2011, pp. 1-24.
Docket Listing, NDCA, Case 3:10-cv-04755-JSW, printed Jan. 6, 2012, pp. 1-12.
Sauer, Matthew, "Company Finds Niche by Giving Directions . . . " Sarasota Herald-Tribune (Florida), Section: Business Weekly, p. 1, Jul. 7, 1997.
"ATX Technologies Signs Nationwide Service Deal with AT&T," Global Positioning & Navigation News, vol. 7, No. 9, May 7, 1997.
"Car Theives Take the 'Bait' in Tulsa; Two Suspects Caught Off Guard with OnGuard Once Again," PR Newswire, Section: Financial News, Jan. 8, 1997.
"Car Theives Take the 'Bait' in Tulsa; Two Suspects Caught Off Guard with on Guard," PR Newswire, Section: Financial News, Dec. 9, 1996.
Jackson, Terry, "Smart Cars Whether by Satellite or the Internet, High-Tech Devices and Services May Make Crumpled Road Maps a Thing of the Past," The Miami Herald, Section: Travel, p. 1J, Oct. 6, 1996.
"San Antonio Personal Security Company Links Up with Senior PGA Golfer," PR Newswire, Section: Financial News, Apr. 1, 1996.
"San Antonio Personal Security Company Links Up with Senior PGA Golfer," Southwest Newswire, Apr. 1, 1996.
Business Briefs, San Antonio Express—News, Mar. 25, 1996.
"ATX Research Signs Exclusive Sales Agreement with Arizona Company," PR Newswire, Mar. 21, 1996.
"ATX Research Signs Exclusive Sales Agreement with Arizona Company, "Southwest Newswire, Mar. 21, 1996.

(56) **References Cited**

OTHER PUBLICATIONS

"Automotive GPS Satellite/Safety System Race is On," Southwest Newswire, Feb. 20, 1996.
"Dealerships Can Track Down New Aftermarket Revenues," PR Newswire, Feb. 9, 1996.
"ATX Research Unveils New Stealthtrac Capability," PR Newswire, Feb. 9, 1996.
"Dealerships Can Track Down New Aftermarket Revenues," Southwest Newswire, Feb. 9, 1996.
Briefs, Global Positioning & Navigation News Wire, vol. 6, No. 2, Jan. 24, 1996.
"ATX Research Provides Police Departments With Onguard Personal Security and Vehicle Tracking System," PR Newswire, Jan. 15, 1996.
"ATX Research Provides Police Departments With Onguard Personal Security and Vehicle Tracking System," Southwest Newswire, Jan. 15, 1996.
"ATX Research Relocates to New Corporate Headquarters," PR Newswire, Dec. 12, 1995.
"ATX Research Relocates to New Corporate Headquarters," Southwest Newswire, Dec. 12, 1995.
"Texas invention tracks stolen cars, lets driver call for help," The Vancouver Sun, Oct. 20, 1995.
"San Antonio Company Unveils Satellite/Cellular Personal Security System," PR Newswire, Oct. 3, 1995.
"San Antonio Company Unveils Satellite/Cellular Personal Security System," Southwest Newswire, Oct. 3, 1995.
PCV*trak*™ Installation and Operator's Manual, Trimble Navigation, 24623-00 Rev. A, May 1994, pp. 1-259.
"Advanced Traveler Aid Systems for Public Transportation," Final Report, Federal Transit Administration, Sep. 1994, pp. 1-131.
Campbell, Laurel, "Security—Military satellite enlisted to thwart car crime," The Commercial Appeal, Sep. 26, 1996, pp. 5B.
Law, Alex, "Week in Wheels/ . . . From a Driver's Notebook," Newsday, Inc., Sep. 20, 1996, pp. CO3.
Cortez, Angela, "Springs police can track thief, vehicles," The Denver Post, Sep. 10, 1996, pp. B-01.
"OnGuard Tracker Nabs Auto Burglar," Global Positioning & Navigation News, vol. 6, No. 16, Aug. 8, 1996.
"OnGuard Tracker Nabs Auto Burglar," Section: Financial News, PR Newswire, Jul. 29, 1996.
Nauman, Matt, "Pressing the Panic Button: Car Security Enters a New Age with Cellular Phones and Satellites that Watch Over You," San Jose Mercury News, Jun. 21, 1996, pp. 1G.
"Monday Briefing" San Antonio Express-News, p. 1, Part B, Jun. 10, 1996.
"OnGuard Tracker Makes Debut on One Lap of America'," PR Newswire, Jun. 7, 1996.
"OnGuard Tracker Makes Debut on 'One Lap of America'," Southwest Newswire, Jun. 7, 1996.
Dominguez, Raul, "Women get their day in sun—American Golf planning events nationwide May 18," San Antonion Express-News, Apr. 18, 1996, pp. 2, part B.
"Vehicle Navigation Units Being Measured in Luxury Autos," Global Positioning & Navigation News, vol. 6, No. 7, Apr. 4, 1996.
"Advanced Business Sciences, Inc. Announces Completion of Acquisition of Comguard of Illinois," Business Wire, Aug. 26, 1998.
"Advanced Business Sciences, Inc. Announces Filing With Secirities and Exchange Commission," Business Wire, Jun. 25, 1999.
"Advanced Business Sciences, Inc. Announces Preliminary Fourth Quarter 1998 Revenue Results," Business Wire, Feb. 4, 1999.
"Business People Burnsy's Grill Names Two," Omaha World-Herald, Section Business, p. 4M, Oct. 20, 1996.
"Company Sees Prisoner Tracking and Monitoring Market Niche," Global Positioning & Navigation News, vol. 6, No. 10, May 16, 1996.
GPS-Based Personal Monitoring Systems Offered to Corrections, Private Market, Global Positioning & Navigation News, vol. 8, No. 11, Jun. 3, 1998.
GPS tracks parolees, probationers, Corrections Professional, vol. 5, No. 6, Nov. 19, 1999.
High-Tech System Tracks Offenders—Satellites Watching Criminals, Business Wire, Nov. 14, 1997.
Briefs, Global Positioning & Navigation News, vol. 9, No. 4, Feb. 24, 1999.
Dunkelberger, Lloyd, "Lawmakers question criminal-tracking system," Sarasota Herald-Tribune (Florida), pp. 16A, Nov. 28, 1999.
Powell, Barbara. "New gadgets help drivers find their way," Fort Worth Star-Telegram (Texas), p. 1, Jan. 20, 1997.
"New Service Lets Corrections Agencies Track Offenders by Satelite," PR Newswire, Jan. 11, 1999.
"New Service Lets Corrections Agencies Track Offenders by Satellite; SecutityLink Offers "GPS" Tracking for Offenders on Electronic Monitoring—Sandusky Municipal Court Adopts Technology for Local Offenders," PR Newswire, Jan. 12, 1999.
"New Service Lets Corrections Agencies Track Offenders by Satellite; SecurityLink Offers 'GPS' Tracking for Offenders on Electronic Monitoring," PR Newswire, Section: Financial News, Jan. 11, 1999.
"New Service Lets Corrections Agencies Track Offenders by Satellite," Satellite Today, vol. 2, No. 8, Jan. 13, 1999.
"Prisoner Security Monitoring Company Grabs Contracts for GPS-Based System," Global Positioning & Navigation News, vol. 7, No. 1, Jan. 15, 1997.
Atwater, Andi, "Proposal seeking 24-hour tracking of all sex offenders," The News-Press (Fort Meyers, FL), pp. 1A, Feb. 20, 2000.
Briefs, Global Positioning & Navigation News, vol. 9, No. 3, Feb. 10, 1999.
Brauer, David, "Satellite 'Big Brother' Tracks Ex-Inmates; Agencies Experiment with GPS to Monitor Parolee Whereabouts," Chicago Tribune, Section: News, p. 31, Dec. 18, 1998.
"Satellite Spotlight; Eye in the Sky to Monitor Parolees," Satellite News, vol. 21, No. 15, Apr. 13, 1998.
"Satellite Spotlight: Fighting Crime From Space," Satellite News, vol. 19, No. 20, May 13, 1996.
Prohaska, Thomas J, "Satellite Will Keep Tabs on Convicts," Buffalo News (New York), Section: Local, p. 5B, Sep. 20, 1999.
"Sierra Wireless and Pro Tech Team Up on Monitoring Product," Global Positioning & Navigation News, vol. 8, No. 8, Apr. 22, 1998.
Anderson, Larry, "Technology rules at Securing New Ground," Access Control & Security Systems Integration, Section: Industry Outlook; ISSN 1084-6425, Dec. 1999.
Trimble Navigation Warns 2nd-Quarter Earnings to Miss Target, Dow Jones Business News, Jul. 10, 1998.
"Trimble Navigation's Net Income Skidded 93% Amid Order Delays," Dow Jones Business News, Jul. 23, 1998.
Briefs, Global Positioning & Navigation News, vol. 9, No. 2, Jan. 27, 1999.
Briefs, Global Positioning & Navigation News, vol. 9, No. 14, Jul. 14, 1999.
Dailey et al. "Automatic Transit Location System," Final Research Report, 55 pgs., Feb. 1996.
Maguire, Jr. et al. "SmartBadges: a weable computer and communication system," codes/CASHE '98, 47 pgs., 1998.
Koshima et al. "Personal locator services emerge," IEEE Spectrum, Febuary 2000, pp. 41-48.
Zygowicz et al. "State of the Art in Automatic Vehicle Location Systems," Center for Urban Transportation Studies, University of Wisconsin, Milwaukee, Feb. 1998.
Ashworth, Jon. "Big brother is watching you," The Times (London), Section: Features, May 7, 1999.
"Car Thieves Take the "Bait" in Michigan; Two Suspects Reeled in With OnGuard," Business Wire, Sep. 11, 1997.
"352022 Miniature Low Profile ICP Accelerometer," Precision Accelerometers, PCB Piezoelectronics Products—SVS Division, webpages, pp. 1-2 (downloaded Apr. 11, 2002: www.pcb.com/products/svs/svs352c22.html).
"3G Mobile Internet Revolution, . . . only with Location Based Services!" pp. 1, (downloaded Aug. 10, 2002: http://webhome.idirect.com/~dental/3glocator/home.htm).
"Airline Cargo Containers," Case Study, RJI Incorporated, webpages, pp. 1-2 (downloaded Mar. 16, 2002: www.rji.cc/casestudies/airlinecargocontainers.html).

(56) **References Cited**

OTHER PUBLICATIONS

"Airline Food Carts," Case Study, RJI Incorporated, webpages, pp. 1-2 (downloaded Mar. 16, 2002: www.rji.cc/casestudies/airlinefoodcarts.html).
"An Introduction to SnapTrack Server-Aided GPS Technology," SnapTrack Inc.
"Audiovox Intros GPS, Bluetooth Phone;" INT Media Group, Inc. (allNetDevices), Apr. 5, 2002. (downloaded:.
"Devices for Text Messages in Deutsche Telekom's fixed network have already found their way into many households," Deutsche Telekom AG, Press Release, Mar. 13, 2002, pp. 1-2.
"Digital/Analog Compass Sensors" and "1655 Digital Compass Sensor," webpages, The Robson Company, Inc., pp. 1-2 (downloaded Apr. 11, 2002: www.dinsmoresensors.com/index.html).
"EarthTrack™ Vehicle Tracking Systems," Outfitter Satellite, Inc., 1998 (downloaded Jan. 22, 2000).
"Enhanced Tracking," United Parcel Service of America, Inc. (UPS), webpages, pp. 1-2 (downloaded Jun. 1, 2002: www.ups.com/myupsinfo/info/etrack?pnav=stdservice).
"Fleet Management Systems-Asset Tracking Devices," Axiom Navigation Inc., 2000-2001 (downloaded Oct. 19, 2002: www.axiomnav.com/Prod_Systems/prod_system.asp).
"Frozen Food Warehouse," Case Study, RJI Incorporated, webpages, pp. 1-3 (downloaded Mar. 16, 2002: www.rji.cc/casestudies/frozenfoodwarehouse.html).
"FunMail Launches on the NTT DoCoMo i-mode network," FunMail, Press Release, May 1, 2001, pp. 1-2.
"Global Cell Phone Location," Axiom Navigation Inc., 2000-2001 (downloaded Oct. 19, 2002: www.axiomnav.com/Prod_Global/prod_global.asp).
"Global Locating Services," SkyBitz, webpage, p. 1, (downloaded Nov. 15, 2002: www.skybitz.com/services/gls.html).
"GLS Communicator," SkyBitz, webpages, pp. 1-2, (downloaded Nov. 15, 2002: www.skybitz.com/g1s/communicator.html).
"Guide to Tracking Info.," Nippon Express, website page, p. 1 (downloaded Jun. 9, 2002: www.nittsu.co.jp/edoc/howtoe.htm).
"Introduction to SMS," by C. Tull of Anywhere YouGo.com, pp. 1-4 (downloaded:www.devx.com/wireless/articles/SMS/SMSintro-asp).
"IO Data Develops GPS Adapter for I-Mode Mobile," AsiaBizTech, Sep. 17, 2002, pp. 1-2.
"Locate Networks: Our Service," Locate Networks, webpages, pp. 1-7 (downloaded Sep. 26, 2002: www.locatenetworks.com/).
"MMS phones: Don't believe the hype," CNN.com/SCI-TECH, Aug. 8, 2002, pp. 1-3.
"Mobile Location Based Services: Cell Tracking Devices of People & Thongs . . . ," pp. 1-2, (downloaded Aug. 10, 2002: http://3glocate.com).
"MoniTrack," Case Study, RJI Incorporated, webpages, pp. 1-2 (downloaded Mar. 16, 2002: www.rji.cc/technology/telematic.html).
"My ups.com Benefits," United Parcel Service of America, Inc. (UPS), webpage, p. 1 (downloaded Apr. 13, 2002: www.ups.com/myupsinfo/info/benefits?pnav=stdsservice).
"NavMate® Navigation System," Visteon Corporation, webpage, pp. 1-2 (downloaded Jun. 21, 2002: www.visteon.com/technolo• /automotive/navmate.html).
"News," SkyBitz, webpages, pp. 1-8, (downloaded Nov. 15, 2002: www.skybitz.com/about/news.html).
"Pakhound: Your Watchdog in The Shipping Industry," website pages, pp. 1-3 (downloaded Jun. 9, 2002: www.pakhound.com/fact.asp).
"Parkwatch and Wherenet Unveil the First Amusement Visitor Locating system," ParkWatch, Press Release, Jun. 27, 2000.
"pulver.com's Location Based Services Report," pulver.com, Inc., Oct. 2001, pp. 1-17 (downloaded Jun. 4, 2002: www.pulver.com/lbsreport/lastbsreport.02/oct01.txt).
"Radio Frequency Identification (RFID)," Case Study, RJI Incorporated, webpage, p. 1 (downloaded Mar. 16, 2002: www.rji.cc/technology/rfid.html).
"Real Time Location System (RTLS)," Case Study, RJI Incorporated, webpage, p. 1 (downloaded Mar. 16, 2002: www.rji.cc/technology/rtls.html).
"Real-Time Warehouse Tracking," Case Study, RJI Incorporated, webpages, pp. 1-2 (downloaded Mar. 16, 2002: www.rji.cc/casestudies/rtwarehousetracking.html).
"Savi Reusable Transport Container," Savi Technology, Inc., Apr. 30, 2002, pp. 1-2.
"Send images to i-mode phones," Mobile Media Japan, 2001, pp. 1-3.
"Ski Rental with Auto ID and Tracking," Case Study, RJI Incorporated, webpages, pp. 1-2 (downloaded Mar. 16, 2002: www.rji.cc/casestudies/skirentalcompany.html).
"SnapTrack and SignalSoft Corp. Team Up to Trial Location-based Information Service for GSM Test Group," Press Release, SnapTrack Inc., Dec. 6, 1999.
"SnapTrack Awarded Additional Key Patents for Enhanced GPS System," Press Release, SnapTrack Inc., Jan. 4, 2000.
"Start-up crams single chip with phone, GPS and Bluetooth," CNET Network, Inc. (ZDNET), Mar. 22, 2002 (downloaded: http://news.zdnet.co.uk/story/0,t284-x2107163,00.html).
"Status Icons/Messages," Yahoo! Messenger Help, Yahoo! Inc., 2002, pp. 1-2.
"Technical Applications of Our Current Technology," Aetherwire, webpages, pp. 1-4 (downloaded Mar. 16, 2002: www.aetherwire.com/CDROM/General/appl1.html).
"The Always on Network," Position Paper, Nortel Networks, 2002.
"Theme Park Visitors & Cashless Purchasing," Case Study, RJI Incorporated, webpages, pp. 1-2 (downloaded Mar. 16, 2002: www.rji.cc/casestudies/themepark.html).
"Track Shipments—Detailed Results," FedEx, webpages, pp. 1-2 (downloaded Oct. 29, 2002: www.fedex.com).
"Track Your FedEx Shipments via Email," FedEx, webpages, pp. 1-2 (downloaded Oct. 29, 2002: www.fedex.com).
"Tracking Helpful Tips," United Parcel Service of America, Inc. (UPS), webpages, pp. 1-2 (downloaded Jun. 1, 2002: www.ups.com/tracking/nm_help.html).
"Trimble and Rosum Team to Develop Universal Positioning Technology," Trimble Navigation, Inc., News Release, Feb. 27, 2003.
"Turning Position Into Knowledge," SkyBitz, webpage, p. 1, (downloaded Nov. 15, 2002: www.skybitz.com).
"UPS Package Tracking," United Parcel Service of America, Inc. (UPS), webpages, pp. 1-2 (downloaded Apr. 13, 2002: www.ups.com/tracking/tracking.html).
"UPS Wireless Solutions," United Parcel Service of America, Inc. (UPS), webpage, p. 1 (downloaded Apr. 13, 2002: www.ups.com/myupsinfo/info/wireless?pnav=stdsservice).
"Welcome to Iship, Inc.," iShip, Inc., webpages, pp. 1-2, (downloaded Jun. 9, 2002: www.iship.com/).
"Welcome to Traker Systems," Tracker Systems, webpages, pp. 1-2 (downloaded Jun. 9, 2002: www.trakersystems.com).
"What are Instant Messages?" Yahoo! Messenger Help, Yahoo! Inc., 2002, pp. 1.
"What is "3G" technology?," CNN.com/SCI-TECH, Oct. 22, 2001, pp. 1-3.
"What is a Friend List?" Yahoo! Messenger Help, Yahoo! Inc., 2002, pp. 1.
"Wherify Wireless and SiRF Team to Deliver Child Locator System," Wherify Wireless, Inc., Press Release, Mar. 19, 2001, pp. 1-2.
"Wherify Wireless Breakthrough in Location-Based Services," Mobilemag.com, Feb. 28, 2001, p. 1.
"Wherify Wireless GPS Locator for Kids User Guide," Wherify Wireless, Inc., 2003, pp. 1-106.
"Wherify Wireless Location Services," Wherify Wireless, Inc., webpages, pp. 1-5 (downloaded: Mar. 25, 2003: www.wherifywireless.com/prod_watches.htm).
"X-GPS™ Hybrid Gps Location Server Solution," Axiom Navigation Inc., 2000-2001 (downloaded Oct. 19, 2002: www.axiomnay.com/Prod_Global/x-gps.asp).
"Yahoo! Messenger—Sending Messages to a Mobile Phone," Yahoo! Messenger, Yahoo! Inc., 2002, pp. 1-7 (downloaded Oct. 27, 2002: http://messenger.yahoo.com/messenger/wireless/pc2sms/tour1.html(through /tour7.html)).

(56) **References Cited**

OTHER PUBLICATIONS

"Yahoo! Messenger for Text Messaging," Yahoo! Messenger, Yahoo! Inc., 2002, pp. 1-10 (downloaded Oct. 27, 2002: http://messenger.yahoo.com/messenger/wireless/smsmsgr/tour1.html (through /tour7.html)).

"Yahoo! Messenger for WAP," Yahoo Messenger, Yahoo! Inc., 2002 (tours 1-9), pp. 1-17 (downloaded Oct. 27, 2002: wvvw.messenger.yahoo.com/messenger/wireless/wap/tour1.html(through /tour9.html)).

Accelerometers—General Purpose, LP Series, Crossbow Technology, Inc., data sheet, pp. 1-3 (downloaded Apr. 11, 2002: www.xbow.com/Products/Accelerometers.htm).

Bickers, "Eyes in the sky," SafeTzone Technology Corporation, webpages, 2001, pp. 1-3 (downloaded: www.safetzone.com/newsKiosk.asp).

Chertkoff, Rachel, "Vehicle Locator Systems," Pager Technology, pp. 1-2, 1998.

Commercial Uses for LoJack (webpage), LoJack Corporation, downloaded Jan. 22, 2000.

Crossbow Product Guide—Accelerometers, Crossbow Technology, Inc., webpages, pp. 1-3 (downloaded Apr. 11, 2002: www.xbow.com/Products/Accelerometers.htm).

Delphi and MobileAria Demonstrate True Hands Free In-Vehicle Mobile Productivity Services at CES, Press Release, Delphi Automotive Systems, Jan. 8, 2002 (downloaded Apr. 5, 2002: www.delphiauto.corninews/pressRelease/pr6828-01082002).

F. Rivera, "Special Report: Keeping Tabs on Your Teen," 7 News, Boston, Apr. 30, 2002, pp. 1-3.

FedEx Insight, FedEx, webpages, pp. 1-11 (downloaded Oct. 29, 2002: www.fedex.com).

GPS2000, Omega Research and Development, Inc., webpages, pp. 1-9 (pp. 7-9 pertain to an online tour) (downloaded Jul., 14, 2003: www.gps2000online.com/).

IMVironment, Yahoo! Messenger Yahoo! Inc., 2002, pp. 1-12 (downloaded (including) Oct. 27, 2002: http://help.yahoo.com/help/us/mesg/imv/imv-01.html(through/index5.html).

J.Wrolstad, "Chrysler Claims First With Bluetooth Mobile Phone System," Wireless Newsfactor, Oct. 26, 2001.

K. Hill, "Prada Uses Smart Tags to Personalize Shopping," CRMDaily.com, Apr., 24, 2002., pp. 1-4.

K. Miyake, "Sharp to unveil 3G PDA-type cell phone," ITworld.com, Inc., Jan. 11, 2002.

Kleinknecht, William, "Juvenile authorities want satellite tracking for felons," The Star-Ledger of New Jersey, Nov. 18, 1997.

LoadTrak, pp. 1-2 (downloaded Jun. 4, 2002: www.load-trak.com).

Marek, "The Unstoppable SnapTrack," Wireless Week, Dec. 18, 2000.

Motorola Consumer Catalog: Pagers (webpage), Motorola, Inc., downloaded Jan. 19, 2000.

My.Roadway!, Roadway Express, Inc., webpages, pp. 1-2, (downloaded Jun. 9, 2002: www.quiktrak.roadway.com/cgi-bin/quiktrak).

Packtrack™, PackTrack.com, webpages, pp. 1-2 (downloaded Jun. 9, 2002: www.packtrack.com).

Precision Accelerometers, PCB Piezoelectronics Products—SVS Division, webpages, pp. 1-2 (downloaded Apr. 11, 2002: www.pcb.com/products/svs/index.html).

Rabinowitz and Spilker, Jr., "A New Positioning System Using Television Synchronization Signals," Rosum Corporation, pp. 1-11 (downloaded May 21, 2003).

Rabinowitz and Spilker, Jr., "Positioning Using the ATSC Digital Television Signal," Rosum Corporation Whitepaper, Rosum Corporation (downloaded May 21, 2003).

Real Time Locating System, Executive Summary, Technology Systems International, Inc., 2007.

Ryan, "Catching up with Dick Tracy," San Francisco Chronicle, news article, Mar. 18, 2002.

SandPiper GPS Receiver, Specification sheet by Axiom Navigation Inc. (www.axiomnay.com)., 2006.

Smart Antenna, Specification sheet by Axiom Navigation Inc. (www.axiomnay.com)., 2008.

SnapTrack—Privacy Protection (webpage), SnapTrack Inc., downloaded Jan. 19, 2000.

SnapTrack—Technology at Work (webpage), SnapTrack Inc., downloaded Jan. 19, 2000.

SnapTrack in Action (webpage), SnapTrack Inc., downloaded Jan. 19, 2000.

Stilp, Louis A., "Examining the Coming Revolution in Location Services," pp. 1-11.

Swift A2 GPS Receiver, Specification sheet by Axiom Navigation Inc. (www.axiomnav.com)., 2010.

Swift B2 GPS Receiver, Specification sheet by Axiom Navigation Inc. (www.axiomnav.com)., 2010.

TruePosition Virtual Brochure (webpage), TruePosition, Inc.

Wong, "Fishers, golfers join the rush to GPS," San Jose Mercury News, news article, Mar. 25, 2002.

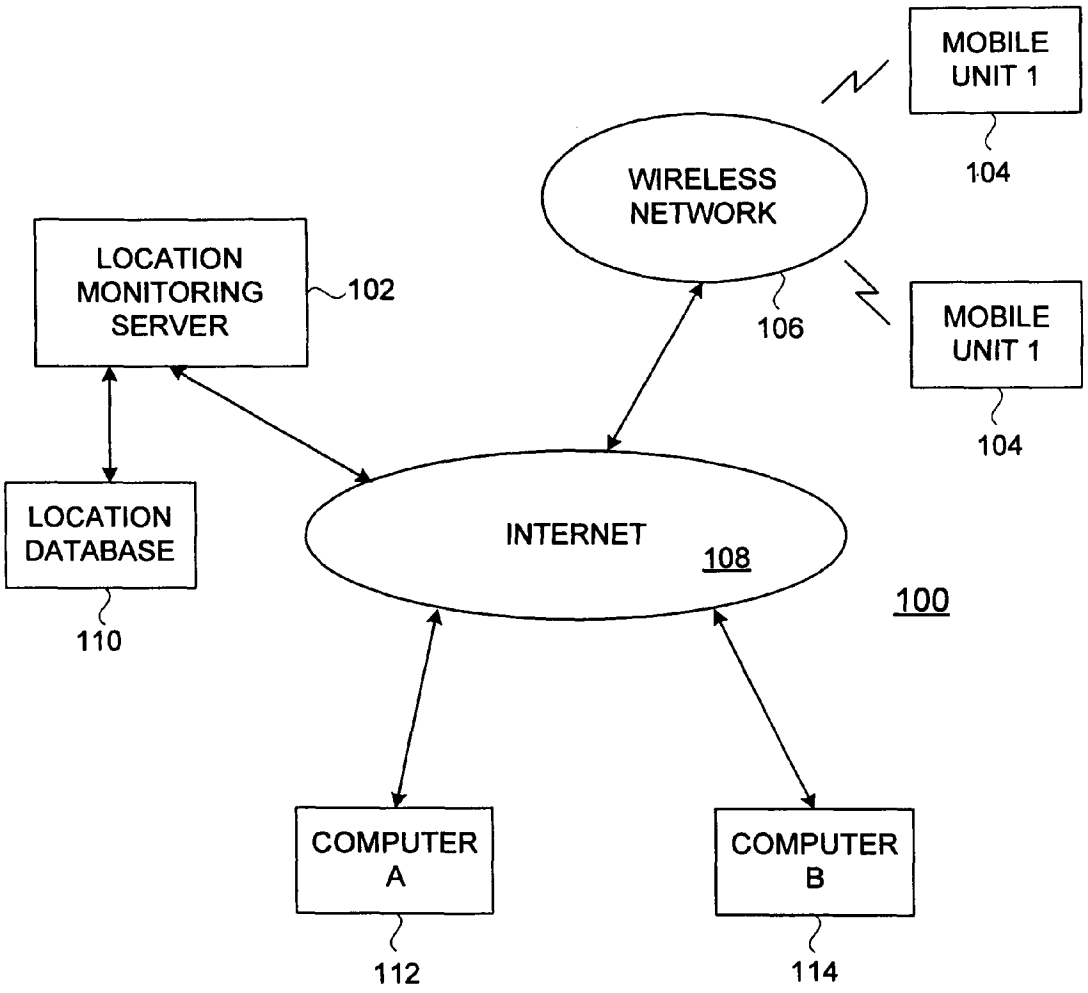
Appenzeller, et al., "The Mobile People Architecture", Technical Report: CSL-TR-00000, Computer Systems Laboratory, Departments of Electrical Engineering and Computer Science, Stanford University, Jan. 1999,pp. 1-13.

Calsyn, Martin and Desseault, Lisa, "Presense Information Protocol Requirements," Internet Draft, Feb. 9, 1998, pp. 1-27.

J. Rosenberg, H. Schulzrinne, Internet Draft, "SIP for Presence," http://www.alternic.org/drafts/drafts-r-s/draft-rosenberg=sip-pip-00.txt, Nov. 13, 1998, Bell Laboratories, Columbia, pp. 1-31.

Notice of Allowance for U.S. Appl. No. 13/831,493, dated Jan. 15, 2014.

* cited by examiner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112
COMPUTER B
114

FIG. 1

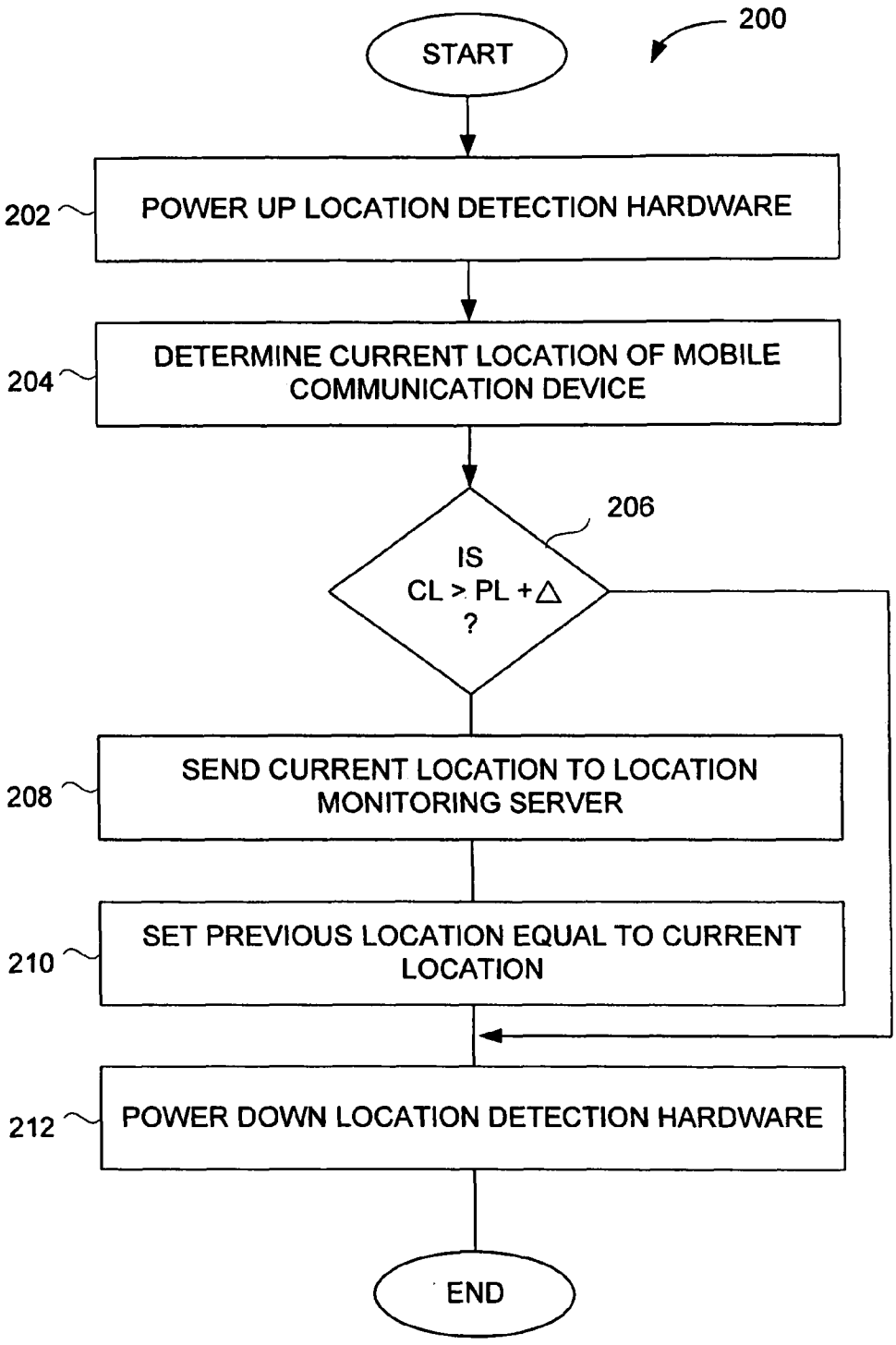
200
START
202
POWER UP LOCATION DETECTION HARDWARE
204
DETERMINE CURRENT LOCATION OF MOBILE COMMUNICATION DEVICE
206
IS CL > PL + Δ ?
208
SEND CURRENT LOCATION TO LOCATION MONITORING SERVER
210
SET PREVIOUS LOCATION EQUAL TO CURRENT LOCATION
212
POWER DOWN LOCATION DETECTION HARDWARE
END

FIG. 2

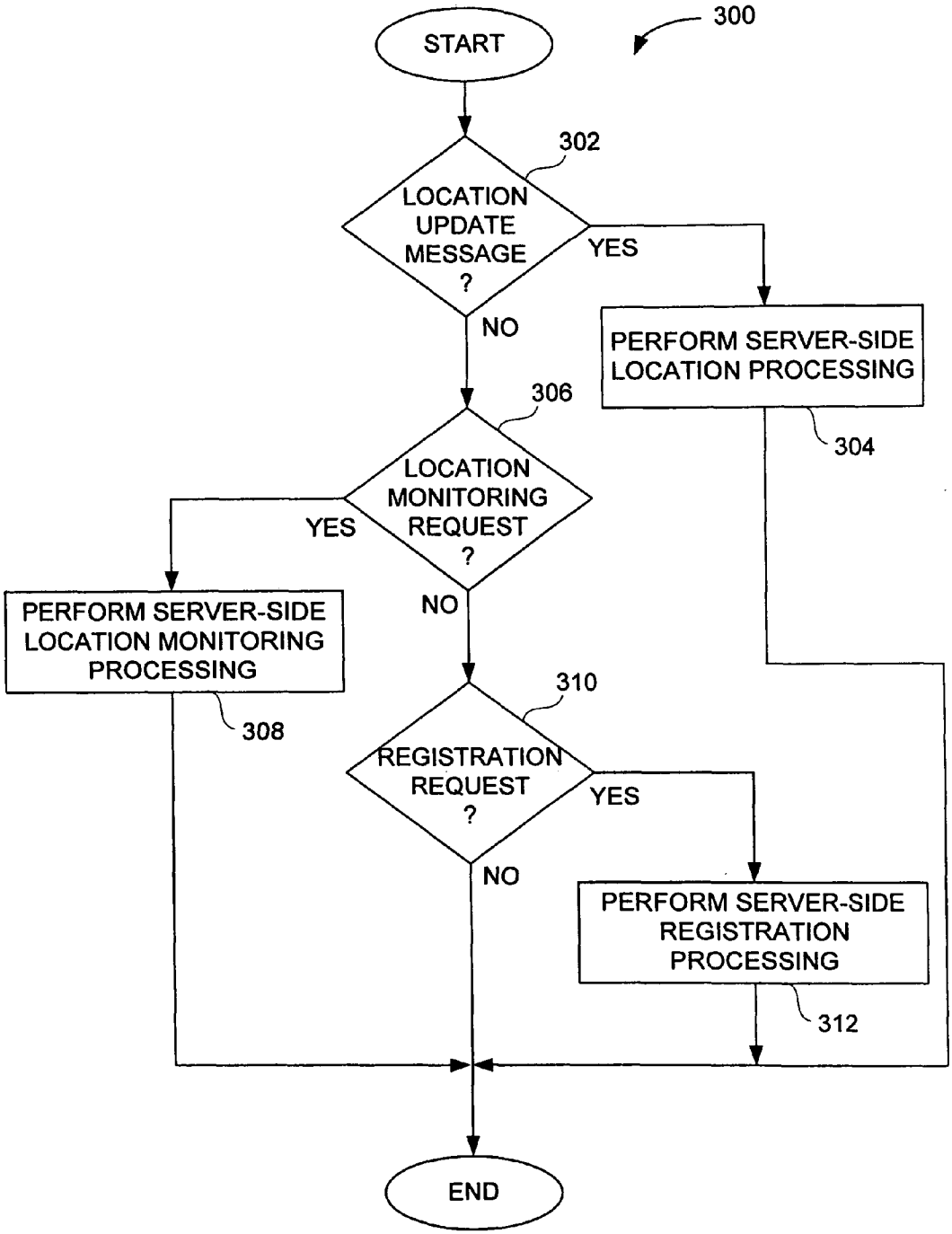
300
START
302
LOCATION UPDATE MESSAGE ?
YES
NO
PERFORM SERVER-SIDE LOCATION PROCESSING
304
306
LOCATION MONITORING REQUEST ?
YES
NO
PERFORM SERVER-SIDE LOCATION MONITORING PROCESSING
308
310
REGISTRATION REQUEST ?
YES
NO
PERFORM SERVER-SIDE REGISTRATION PROCESSING
312
END

FIG. 3

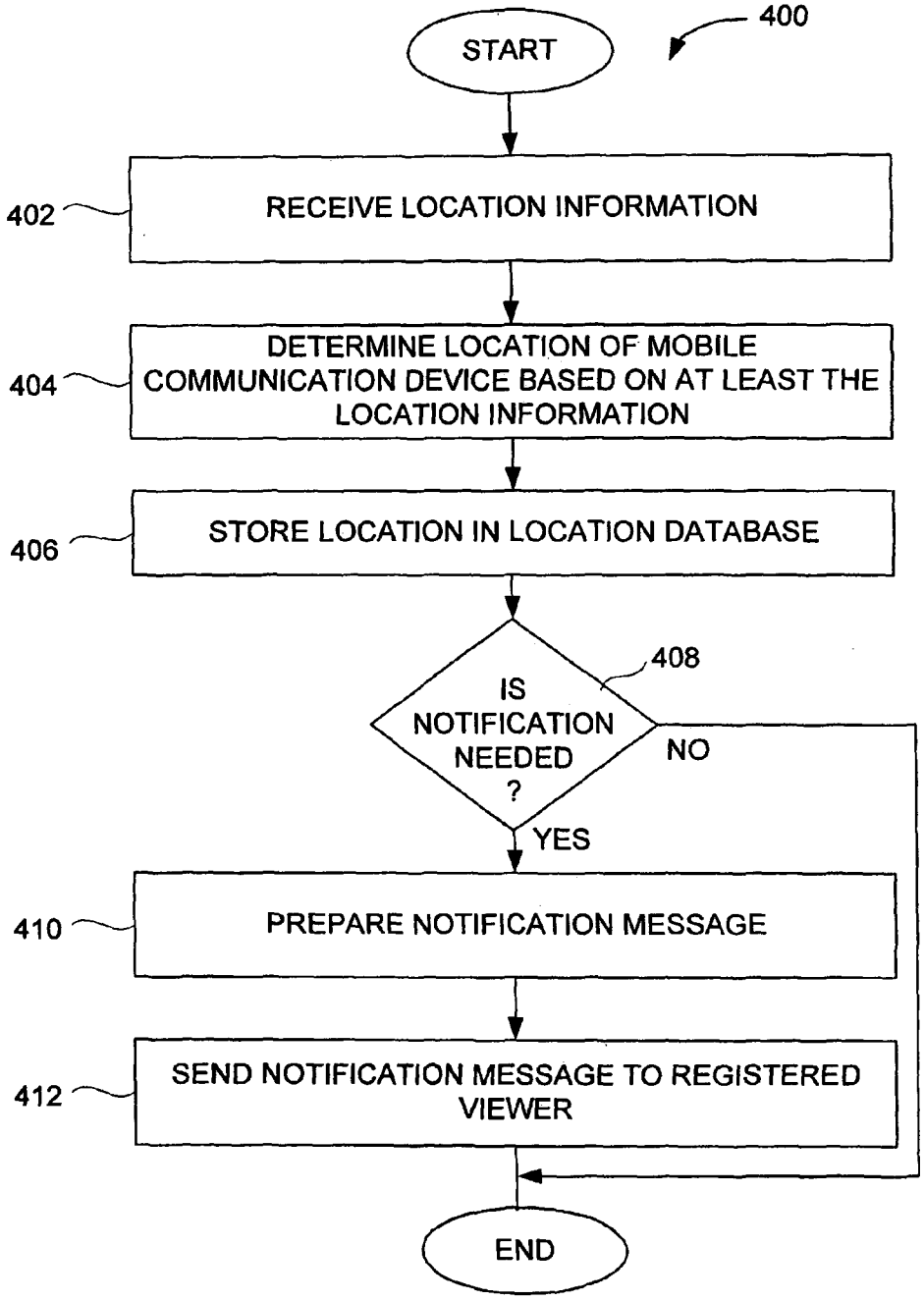
400
START
402
RECEIVE LOCATION INFORMATION
404
DETERMINE LOCATION OF MOBILE COMMUNICATION DEVICE BASED ON AT LEAST THE LOCATION INFORMATION
406
STORE LOCATION IN LOCATION DATABASE
408
IS NOTIFICATION NEEDED ?
NO
YES
410
PREPARE NOTIFICATION MESSAGE
412
SEND NOTIFICATION MESSAGE TO REGISTERED VIEWER
END

FIG. 4

500

MD	USER	SUPERVISOR	PASSWORD	LOGGED_IN
1	John	Barb	1234	1
2	Jane	Bill	5678	0

FIG. 5A

550

MD	CURRENT LOCATION	PREVIOUS LOCATION
1	XXX	YYY
2	WWW	ZZZ

FIG. 5B

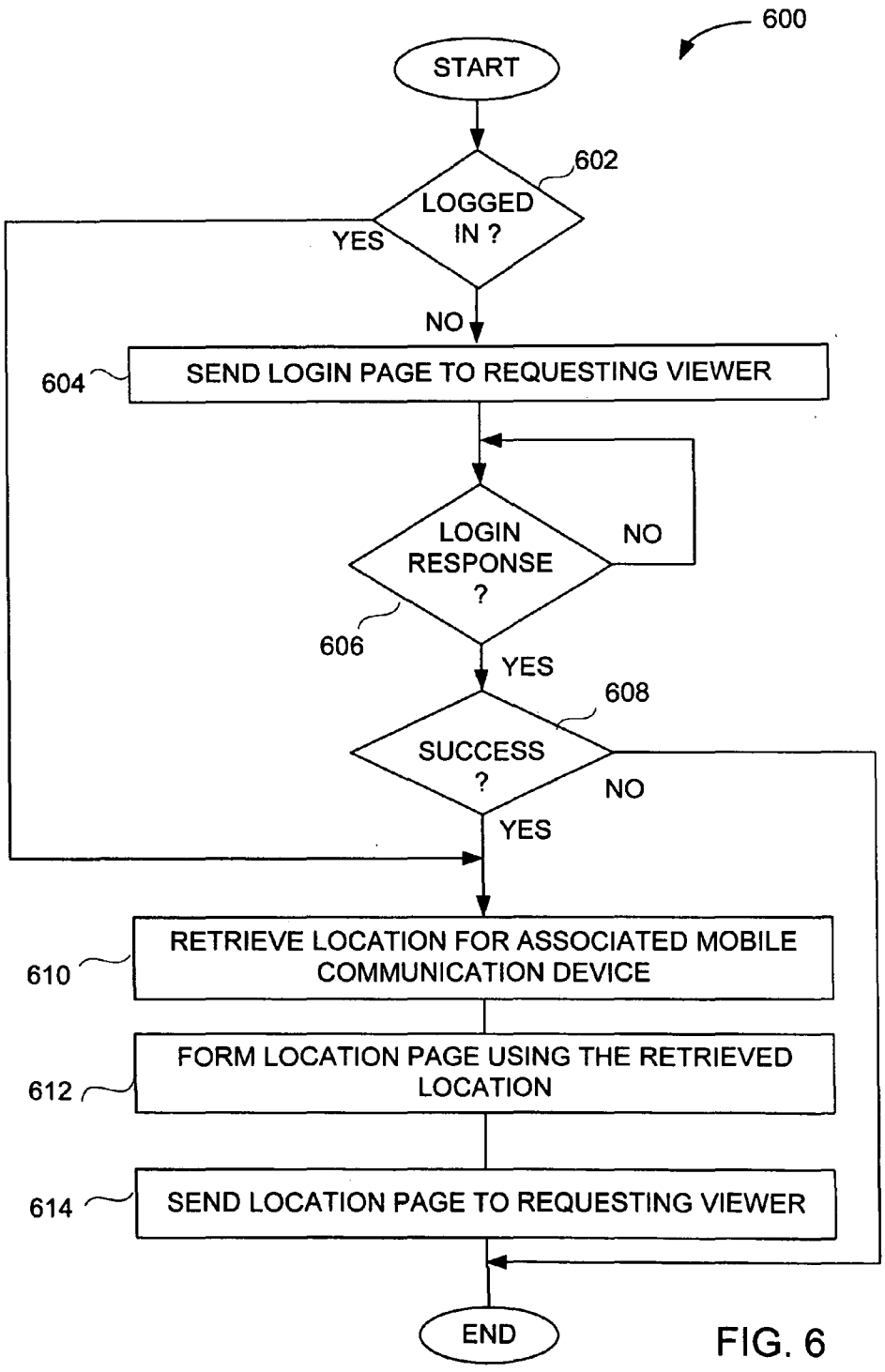
600
START
602
LOGGED IN ?
YES
NO
604
SEND LOGIN PAGE TO REQUESTING VIEWER
LOGIN RESPONSE ?
NO
606
YES
608
SUCCESS ?
NO
YES
610
RETRIEVE LOCATION FOR ASSOCIATED MOBILE COMMUNICATION DEVICE
612
FORM LOCATION PAGE USING THE RETRIEVED LOCATION
614
SEND LOCATION PAGE TO REQUESTING VIEWER
END

FIG. 6

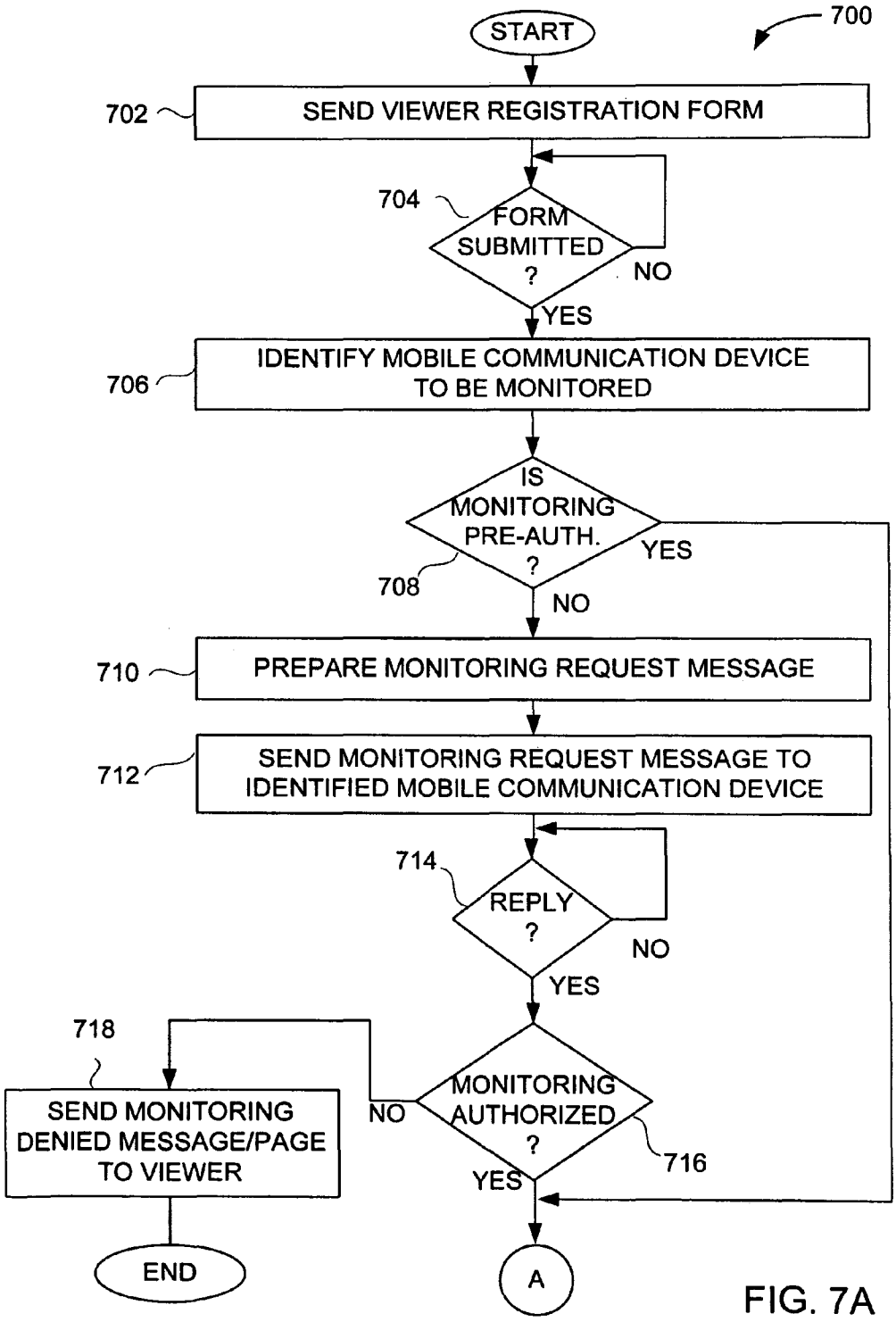
700
START
702
SEND VIEWER REGISTRATION FORM
704
FORM SUBMITTED ?
NO
YES
706
IDENTIFY MOBILE COMMUNICATION DEVICE TO BE MONITORED
IS MONITORING PRE-AUTH. ?
708
YES
NO
710
PREPARE MONITORING REQUEST MESSAGE
712
SEND MONITORING REQUEST MESSAGE TO IDENTIFIED MOBILE COMMUNICATION DEVICE
714
REPLY ?
NO
YES
718
MONITORING AUTHORIZED ?
716
NO
YES
SEND MONITORING DENIED MESSAGE/PAGE TO VIEWER
END
A

FIG. 7A

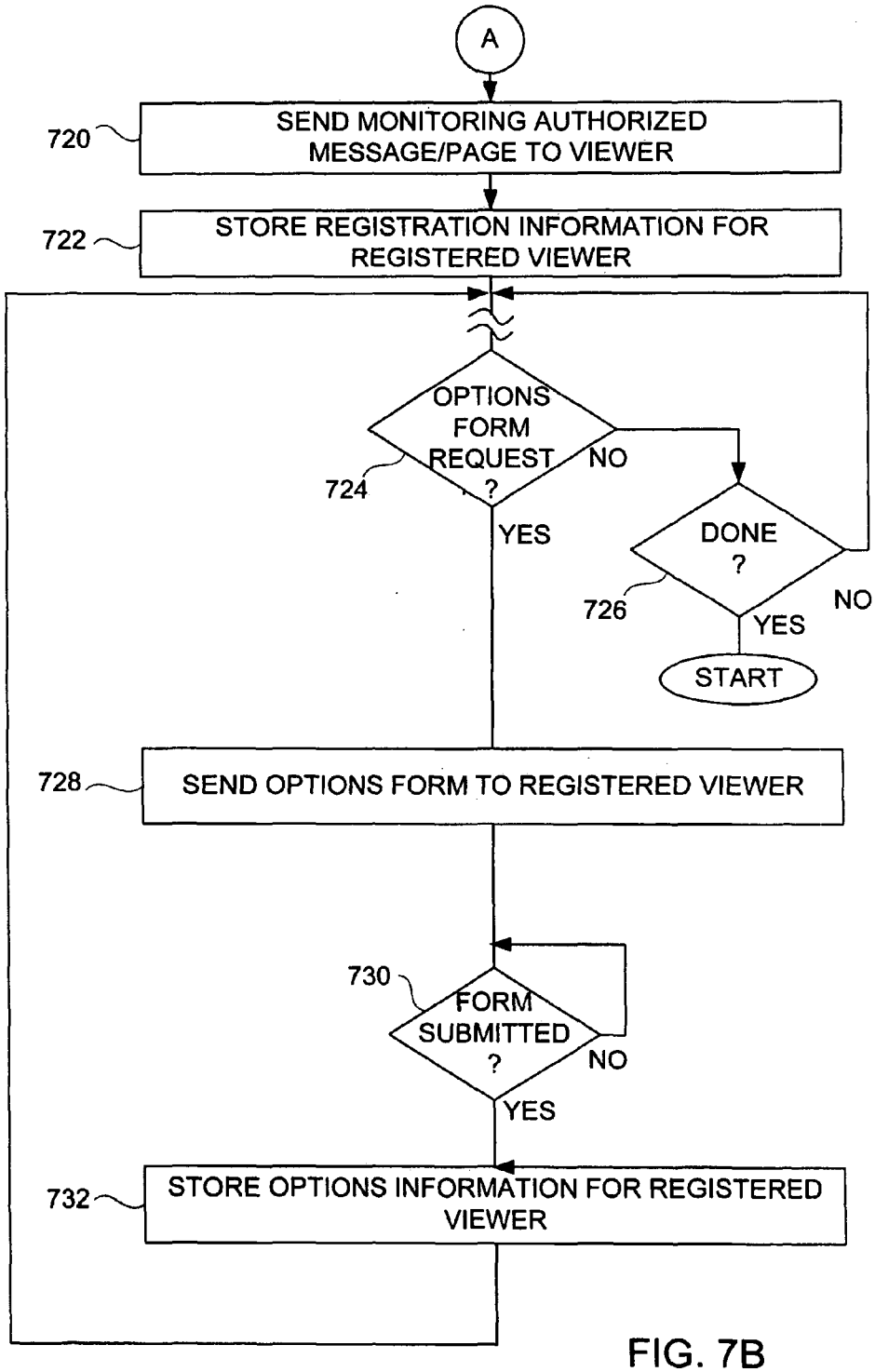
A
720
SEND MONITORING AUTHORIZED MESSAGE/PAGE TO VIEWER
722
STORE REGISTRATION INFORMATION FOR REGISTERED VIEWER
724
OPTIONS FORM REQUEST ?
NO
YES
726
DONE ?
NO
YES
START
728
SEND OPTIONS FORM TO REGISTERED VIEWER
730
FORM SUBMITTED ?
NO
YES
732
STORE OPTIONS INFORMATION FOR REGISTERED VIEWER

FIG. 7B

METHOD AND SYSTEM FOR AUTHORIZING LOCATION MONITORING

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional application of U.S. patent application Ser. No. 09/797,517, filed Feb. 28, 2001 (now U.S. Pat. No. 7,366,522), entitled "METHOD AND SYSTEM FOR LOCATION TRACKING", which is hereby incorporated by reference herein, and which application claims the benefit of U.S. Provisional Patent Application No. 60/185,480, filed Feb. 28, 2000, and entitled "METHOD AND SYSTEM FOR LOCATION TRACKING", which is hereby incorporated by reference herein.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to computing or communication devices and, more particularly, to location tracking of computing or communication devices.

2. Description of the Related Art

Today, various types of or computing devices having communication capabilities (e.g., wireless communication devices) are available. Examples of computing devices having communication capabilities include pagers, mobile phones, personal digital assistants (PDAs), palm-top computers, and electronic schedulers.

Recently, computing devices have been able to detect their location though Global Positioning Satellites (GPS) or with the assistance of a network (e.g., cellular network). As an example, U.S. Pat. No. 5,959,557 describes a system in which a GPS receiver is used to measure a position of a mobile unit (i.e., vehicle), and reports the position on a map. However, such conventional approaches do not allow for control and general utilization of the position information.

Thus, there is a need for ways to utilize position information of mobile computing devices.

SUMMARY OF THE INVENTION

Broadly speaking, the invention relates to techniques for location tracking, location utilization, and dissemination and management of location information.

The invention can be implemented in numerous ways including, a method, system, device, and a computer readable medium. Several embodiments of the invention are discussed below.

As a method for monitoring position of a plurality of persons, each of the persons having a mobile computing device proximate thereto, one embodiment of the invention can, for example, include at least: obtaining locations for the mobile computing devices and thus the persons proximate thereto; receiving, from a viewing party, a request to view the location pertaining to a particular one of the persons; determining whether the viewing party is permitted to receive the location of the particular one of the persons, such determining comprising sending a location access request notification to a mobile computing device for approval or disapproval of the location access request, the mobile computing device receiving the location access request notification is associated with a party other than the viewing party; and delivering, to the viewing party, the location pertaining to the particular one of the persons provided that it is determined that the viewing party is permitted to receive such a response.

As a location monitoring system, one embodiment of the invention can, for example, include at least: a plurality of mobile electronic devices supported by a wireless network, each of the mobile electronic devices being associated with and proximate to a corresponding object; and a computing device operatively connectable to the wireless network. The computing device stores locations of each of the mobile electronic devices, and the computing device enabling certain users to be authorized to access the locations of the mobile electronic devices via one or more networks. In managing authorization for access to locations of the mobile electronic devices, one embodiment the computing device (i) receives, from a requesting user, a request to view the location pertaining to a particular one of the objects; (ii) determines whether the requesting user is authorized to receive the location of the particular one of the objects; and (iii) delivers the location pertaining to the particular one of the objects to the requesting user provided that it is determined that the requesting user is authorized to receive such a response.

As a computer readable medium including at least computer program code tangible stored thereon for monitoring position of a plurality of persons, each of the persons having a mobile unit proximate thereto, one embodiment of the invention can, for example, include at least: computer program code for obtaining locations of the mobile units and thus the persons proximate thereto; computer program code for receiving, from a viewing party, a request to view the location pertaining to a particular one of the persons; computer program code for determining whether the viewing party is permitted to receive the location of the particular one of the persons, said computer program code for determining comprising computer program code for sending a location access request notification to a mobile unit for approval or disapproval of the location access request; and computer program code for delivering, the viewing party, the location pertaining to the particular one of the persons provided that said computer program code for determining determines that the viewing party is permitted to receive such a response.

Other aspects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be readily understood by the following detailed description in conjunction with the accompanying drawings, wherein like reference numerals designate like structural elements, and in which:

FIG. **1** is a block diagram of location monitoring system according to one embodiment of the invention;

FIG. **2** is a flow diagram of client-side location processing according to one embodiment of the invention;

FIG. **3** is a flow diagram of server-side location management processing according to one embodiment of the invention;

FIG. **4** is a flow diagram of server-side location processing according to one embodiment of the invention;

FIG. **5**A is a diagram of an exemplary authorization table in a location database;

FIG. **5**B is a diagram of an exemplary location table in a location database;

FIG. **6** is a flow diagram of server-side location monitoring processing; and

FIGS. 7A and 7B are flow diagrams of server-side registration processing.

DETAILED DESCRIPTION OF THE INVENTION

The invention pertains to techniques for location tracking, location utilization, and dissemination and management of location information.

Embodiments of this aspect of the invention are discussed below with reference to FIGS. 1-7B. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond these limited embodiments.

FIG. 1 is a block diagram of location monitoring system 100 according to one embodiment of the invention. A location monitoring server 102 manages location information pertaining to a plurality of mobile units 104. The mobile units are typically attached to objects, such as people, vehicles, or containers. A wireless network 106 enables the mobile units 104 to communicate with the location monitor server 102. In one embodiment, the wireless network 106 couples to the Internet 108 (or other data network). The location monitoring server 102 also couples to the Internet 108. Location information associated with the mobile units 104 is thus able to be delivered to the location monitoring server 102 through the wireless network 106 and the Internet 108. A location database 110 coupled to the location monitoring server 102 can store the location information for the mobile units 104. The location monitoring server 102 is then able to utilize the location information by accessing the data stored in the location database 110. The location database 110 can reside on the location monitoring server or a separate local or remote computer.

The location monitoring system 100 can also include remote computers 112 and 114 that can couple to the Internet 108 through various means. Once coupled to the Internet 108, the remote computers 112 and 114 can access the location monitoring server 102 to receive location related services or to otherwise make use of the location information.

Each mobile unit can obtain location information on its location and forward the location information to the location monitoring server (web server). The location information can be forwarded to the location monitoring server by a variety of ways. One way is through use of a Short Message Service (SMS) message. The location information can also be obtained by a variety of methods. One method is to provide a Global Positioning Satellite (GPS) device within the mobile units. With GPS, the location information obtained can be distances to a plurality of global positioning satellites or can be a determined location from processing of the distances. When only the distances are provided, then the mobile unit merely sends the distances and need not perform processing to determine the location from the distances (instead a server can do so). Another method is to use location information obtained from a wireless network. With this method, the wireless network can provide location information on some or all of said mobile computing devices to the location monitoring server. In this case, the mobile units need not participate in obtaining the location information. As yet another method, a combination of these or other methods can be used to gather an accurate location for the mobile devices. For example, the location monitoring server could be provided with location information provided from the wireless network as well as location information provided by the mobile units themselves. By using the location information from both sources, more accurate and reliable location determination is able to be performed.

FIG. 2 is a flow diagram of client-side location processing 200 according to one embodiment of the invention. The client-side location processing 200 is performed on a client device, such as the mobile units 104 illustrated in FIG. 1.

The client-side location processing 200 initially powers-up 204 the location detection hardware within the client device. Next, the current location of the mobile communication device (client device) is determined 206. A decision 208 then determines whether the current location (CL) is greater than the previous location (PL) by more than a delta amount (Δ). When the decision 208 determines that the current location is not greater than the previous location by more than the delta amount, the current location is sent 208 to the location monitoring server. Here, the current location can be sent to the location monitoring server in a variety of different electronic ways. These ways include email, file transfer, etc. Then, the previous location is set 210 equal to the current location. Following the operation 210, as well as directly following the decision 208 when the current location does not exceed the previous location by more than the delta amount, the location detection hardware within the mobile communication devices is powered-down 212. Following the operation 212 the client-side location processing 200 is complete and ends.

According to this embodiment, the client device powers up to send its current location to a location monitoring server and then powers down to conserve power usage. In the embodiment shown in FIG. 2, the current location is sent to the location monitoring server only when it differs from the previous location by more than a predetermined amount. This conserves not only network bandwidth but also power usage at the client device.

Alternatively, the new location could be determined and/or sent only after a sensor internal to the client device (mobile unit) indicates that it has undergone significant movement since the previous location was obtained. A wide variety of sensors can be used. For example, motion sensors are readily available that indicate distances walked or run. Using such a sensor would reduce the frequency with which the new location should be determined and/or transmitted, thus saving network bandwidth and conserving power consumption. Such a motion sensor can be built into the client device, then if minimal motion detected, then no location detection need be triggered (or triggered less frequently). This provides automatic shut down of circuitry within the client device when the client device is not moving, in the evening (e.g., user sleeping), in a meeting, in one's office at work, etc.

As another alternative, invoking of the client-side location processing 200 can be performed periodically in accordance with a predetermined period. The predetermined period for the periodic location determination can vary with time of day and day of week. For example, the location determination can be made more frequently during the day and less frequently in the evening. As a further example, different predetermined period can be assigned for different days of the week.

As still another alternative, the client-side location processing 200 can be invoked only when a thermal sensor provided with the client device indicates that the mobile device is being worn by its user. Here, the thermal sensor could be utilized to effectively turn off the location monitoring or transmission circuitry and thus conserve power when the client device is not being worn by its user.

As yet still another alternative, the location monitoring server or some other server could send a request for location information to a client device and thus invoke the acquisition

of the current location on the client device. In this regard, the request for the location information could be sent to the client devices only when such information is being remotely monitored by another. Such techniques would also facilitate conservation of power utilization on the client device as well as network bandwidth.

The determination of the location of the client device can thus be triggered or invoked by the client device itself or a location monitoring server (or other remote server) using any of a variety of ways (used separately or in combination). The location of the client device (mobile device) can be determined by the client device itself (e.g., using GPS), by a wireless network infrastructure, or through a combination of both.

FIG. **3** is a flow diagram of server-side location management processing **300** according to one embodiment of the invention. The server-side location management processing **300** begins with a decision **302** that determines whether a location update message has been received. Here, the location update message is a message being sent to the location monitoring server by a particular one of the mobile units. When the decision **302** determines that a location update message has been received, then server-side location processing is performed **304**. The server-side location processing is able to determine the location of the mobile unit (mobile communication device) and store the location into a location database, such as the location database **110** as illustrated in FIG. **1**. Additionally, the server-side location processing can notify interested registered viewers. Additional information on the server-side location processing is discussed below with respect to FIG. **4**.

On the other hand, when the decision **302** determines that a location update message has not been received, then a decision **306** determines whether a location monitoring request has been received. When the decision **306** determines that a location monitoring request has been received, server-side location monitoring processing is performed **308**. As an example, a location monitoring request is received by remote computer, such as one of the computers **112** and **114** illustrated in FIG. **1**. The server-side location monitoring processing is able to provide viewers (e.g., registered viewers at the remote computers) with location or position of the one or more mobile units (or associated objects) of interest. The server-side location monitoring processing is further discussed below with respect to FIG. **6**.

Alternatively, when the decision **306** determines that a location monitoring request has not been received, then a decision **310** determines whether a registration request has been received. Typically, the registration request would be received at the location monitoring server and would have been sent by one of the remote computers **112** or **114** (or their users). In any case, when the decision determines that a registration request has been received, server-side registration processing is performed **312**. The server-side registration processing generally operates to register a user, or the user's computer, for use with the location monitoring system such that location information is able to be accessed and viewed on the viewer's computer. In this regard, various features provide for the mobile users to control who is able to view their location, as well as to send alerts or notifications to authorized registered viewers when certain location-based events occur. Additional details on the server-side registration processing are discussed below with respect to FIGS. **7**A and **7**B.

Following the operations **304**, **308** and **312**, the server-side location management processing **300** is complete and ends. However, the server-side location management processing **300** is effectively invoked when an incoming message or request is received at the location monitoring server.

Although not shown in FIG. **3**, when a location monitoring request is received from a monitoring party, prior to performing the server-side location monitoring processing, the monitoring party must login with an appropriate user name and/or password. This allows restricted access to the location information. In one embodiment, the users of the mobile units can control whether monitoring parties are given access to their location information by authorizing certain monitoring parties.

FIG. **4** is a flow diagram of server-side location processing **400** according to one embodiment of the invention.

The server-side location processing **400** is, for example, performed by a location monitoring server, such as the location monitoring server **102** illustrated in FIG. **1**. The server-side location processing **400** initially receives **402** location information. Typically, the location information is received from a mobile communication device (mobile unit) and/or a carrier network (e.g., wireless network). Next, the location of the mobile communication device is determined **404** based on at least the location information. Here, the location information could itself be sufficient to enable the determination of the location of the mobile communication device. Alternatively, the location information could be combined with other information in order to determine the location of the mobile communication device (or to more accurately determine the location of the mobile communication device). In another embodiment, the location information could actually indicate the location. In any case, once the location of the mobile communication device has been determined **404**, the location is stored **406** in a location database. As an example, the location database can be the location database **110** illustrated in FIG. **1**.

Next, a decision **408** determines whether a notification is needed. Here, the server-side location processing **400** is able to send notifications to registered viewers as appropriate. The decision **408** determines whether a notification is needed to inform one or more registered viewers about the location information that has just been received and processed. Hence, when the decision **408** determines that a notification is needed, a notification message is prepared **410**. Then, the notification message is send **412** to the one or more appropriate registered viewers. Following the operation **412**, as well as directly following the decision **408** when no notifications are needed, the server-side location processing **400** is complete and ends.

As noted above, the server-side location processing **400** includes the decision **408** that determines whether any notification is needed. Here, based on the location of the mobile communication device, various notifications can be initiated. The various notifications can, for example, alert of a predetermined location, alert of an unauthorized region, alert of change in location, etc. The notification can be sent to the monitoring party through an email message (including two-way pager message), an instant response web-based message, through a web page provided at the mobile communication device, telephone message, and the like.

FIG. **5**A is a diagram of an exemplary authorization table **500** in a location database. The exemplary authorization table **500** includes a row of information for each mobile device being monitored. Each row contains information on: mobile device identifier, user, supervisor (monitoring party), password, and whether logged in.

FIG. **5**B is a diagram of an exemplary location table **550** in a location database. The exemplary location table **550** includes a row of location information for each of the mobile

devices being monitored. Each row contains information on: mobile device identifier, current location, and previous location. The location can include much more historical information to keep a log of the locations of the mobile device over an extended period of time (e.g., day, week, month, year).

FIG. **6** is a flow diagram of server-side location monitoring processing **600** according to one embodiment of the invention. The server-side location monitoring processing **600** begins with a decision **602** that determines whether a requesting viewer (monitoring party) has logged-in. Here, typically a request is received from a requesting viewing that seeks to either to log-in or to receive a location page. Hence, the decision **602** initially determines whether the requesting viewer is logged-in. When the decision **602** determines that the requesting viewer is not yet logged-in, then a log-in page is sent **604** to the requesting viewer. Then, a decision **606** waits for a log-in response. When the decision **606** determines that a log-in response has not yet been received, the server-side location monitoring processing **600** effectively awaits a log-in response (or a suitable time-out). Once the decision **606** determines that a log-in response has been received, then a decision **608** determines whether the log-in is successful. When the decision **608** determines that the log-in is not successful, then the server-side location monitoring processing **600** is complete and ends with the requesting viewer being denied access to the location related information. On the other hand, when the decision **608** determines that the log-in has been successful, as well as directly following the decision **602** when the requesting viewer is already logged-in, the location for the associated mobile communication device (mobile unit) is retrieved **610**. As an example, the location can be retrieved from the location database **110** by the location monitoring server **102** illustrated in FIG. **1**. Then, a location page using the retrieved information can be formed **612**. Here, the location page represents the formatting of the location information into a suitable format, such as a document, that can be delivered to the requesting viewer. As an example, the location page can be a marked-up language document such as HTML, XML, HDML, or other markup language. The location page can also be customized for the type of computing device being utilized by the requesting viewer. Then, the location page is sent **614** to the requesting user. Following the operation **614**, the server-side location monitoring processing **600** is complete and ends with the requesting viewer having received the requested location information.

Following successful login by a requesting viewer (monitoring party), the location for the mobile communication device that the requesting viewer has been authorized to receive is able to be retrieved. Then, the location is provided (i.e., sent) to the requesting viewer. In one embodiment, the location is part of a web page that is sent to the requesting viewer.

A server-side registration processing allows a viewer (requesting viewer) to request to view the location of a particular mobile communication device or it associated object. Access is denied if the viewer is not authorized. In one embodiment, the authorization can be controlled by the owner or user of the particular mobile communication device. The server-side registration processing also allows the viewer to set options. The options that can be set are numerous. Examples of the options include notifications or alerts, type of alert or notification (phone, pager, email, etc.), unauthorized or authorized locations, save history or not, labels for different locations (e.g., home, school, work, etc.). By saving the history (i.e., location history), the viewer is able to subsequently examine a history of movement. The history of movement can be presented to the viewer in textual or graphical formats.

FIGS. **7**A and **7**B are flow diagrams of server-side registration processing **700** according to one embodiment of the invention. The server-side registration processing is, for example, performed by the location monitoring server **102** illustrated in FIG. **1**.

The server-side registration processing **700** initially sends **702** a viewer registration form to a user attempting to register with the location monitoring server. As an example, the viewer registration form can be delivered to a computer associated with the user over the Internet and be displayed in a browser application associated with the user's computer. After the viewer registration form has been sent **702** to the viewer, a decision **704** determines whether the registration form has been submitted. Here, the server-side registration processing **700** is awaiting the return of the viewer registration form. When the decision **704** determines that the viewer registration form has not been returned, then the server-side registration processing **700** awaits its submission. On the other hand, when the decision **704** determines that the viewer registration form has been submitted (or times-out), then the mobile communication device to be monitored is identified **706**. The mobile communication device to be monitored can be identified **706** from the information provided in the viewer registration form or from other information obtained from the viewer (e.g., from a separate page or form submitted by the viewer).

Next, a decision **708** determines whether monitoring of the particular mobile communication device has been pre-authorized. When the decision **708** determines that the monitoring for the particular mobile communication device has not been pre-authorized, then a monitoring request message is prepared **710**. The monitoring request message is then sent **712** to the particular mobile communication device identified **706**. At this point, the server-side registration processing **700** is effectively waiting for a reply from the particular mobile communication device or its user as to whether or not the requested monitoring is authorized. When a decision **714** receives a reply to the request for authorization, then a decision **716** determines whether the reply has authorized monitoring. When the decision **716** determines that monitoring has not been authorized (i.e., monitoring has been denied) then a monitoring denied message/page is sent **718** to the viewer. Thereafter, a server-side registration processing **700** is complete and ends.

Following the decision **716** when the monitoring has been authorized, as well as directly following the decision **708** when the monitoring has been pre-authorized, a monitoring authorized message/page is sent **720** to the viewer. The monitoring authorized message/page informs the viewer that the requested monitoring of the particular mobile communication device or its associated object has been approved. Then, registration information for the registered viewer is stored **722**.

Thereafter, whenever a registered user desires to set options with respect to the manner in which they monitor location of mobile communication devices or its associated object, such registered viewers can complete and submit an options form. Hence, a decision **724** determines whether an options form request has been received. When the decision **724** determines that an options form request has not been received, then a decision **726** determines whether the server-side registration processing **700** is complete. When the decision **726** determines that the registration is complete (done), then the server-side registration processing **700** is complete and ends. On the other hand, when the decision **726** deter-

mines that the server-side registration processing **700** is not complete, then the server-side registration processing **700** returns to repeat the operations following the operation **722**.

Alternatively, when the decision **724** determines that an options form request has been received, then an options form is sent **728** to the registered viewer. Then, a decision **730** determines whether the options form has been submitted. When the decision **730** determines that the options form has not yet been submitted, then the server-side registration processing **700** awaits submission of such a form. When a decision **730** determines that the options form has been submitted, then the options information provided by the options form is stored **732** for the registered viewer. Following the operation **732**, the server-side registration processing **700** returns to repeat the operations following the operation **722**.

It should be noted that the server-side registration processing **700** need not wait for the form submission at operations **704** or **730**, or the reply message at operation **714**, but can instead utilize a database or other data store to store state information such that the server-side registration processing **700** can proceed efficiently without being blocked or held-up while waiting for feedback from viewers or users of mobile communication devices. Such is well know in the programming fields, particularly with Internet programming.

Still further the invention is suitable for tracking delivery or maintenance personnel or vehicles. When a delivery or service appointment is made, you can receive a code for the truck or person that is going perform the delivery or service. Then, on the delivery day (days) when the truck or person is to deliver to or service one's home or business, an alert message or notification can be sent to the requestor (e.g., home owner or office manager). As examples, the message or notification is electronic and include a page, email or telephone type messages or notifications. Hence, if the homeowner is impatiently waiting for the delivery, they can access the location of the truck or person that is to perform the delivery or service. Still further, the requestor may also obtain schedule information on the person or vehicle, and thus determine how many other are scheduled before you. The schedule could also be updated by the truck or person (or their business) to reflect an up-to-date version through out their day. Hence, the requestor is able to obtain additional information over the Internet without have to wait impatiently or having to phone the associated business for information.

The mobile unit (client device, mobile communications device or mobile computing device) is, for example, one of a pager, mobile phone, personal digital assistant, or reduced size portable computing device.

U.S. Pat. No. 5,959,557 is hereby incorporated herein by reference.

The invention can, at least partly, be embodied as computer readable code (computer readable program code) on a computer readable medium. The computer readable medium is any data storage device that can store data which can be thereafter be read by a computer system. Examples of the computer readable medium include read-only memory, random-access memory, CD-ROMs, magnetic tape, and optical data storage devices. The computer readable medium can also be distributed over a network coupled computer systems so that the computer readable code is stored and executed in a distributed fashion.

The advantages of the invention are numerous. Different embodiments or implementations may yield one or more of the following advantages. One advantage of the invention is that location of objects can be tracked via the Internet. Another advantage of the invention is that objects, such as persons, can control the dissemination of their location information. Another advantage of the invention is that alerts or notification can be triggered based on locations of objects. Another advantage of the invention is that mobile computing devices providing location monitoring capabilities are small (e.g., wearable) and offer low power consumption (e.g., long battery life). Another advantage of the invention is that embodiments can operate without user input or actions.

The many features and advantages of the present invention are apparent from the written description and, thus, it is intended by the appended claims to cover all such features and advantages of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art: it is not desired to limit the invention to the exact construction and operation as illustrated and described. Hence, all suitable modifications and equivalents may be resorted to as falling within the scope of the invention.

The invention claimed is:

1. A computer-implemented method for monitoring position of a plurality of persons via a networked location monitoring system, each of the persons having a mobile computing device proximate thereto, said method comprising:

obtaining locations for the mobile computing devices and thus the persons proximate thereto;

receiving, at the networked location monitoring system, a request initiated by a viewing party to access the location pertaining to a particular one of the persons;

determining, at the networked location monitoring system, whether the viewing party is permitted to access the location pertaining to the particular one of the persons, said determining comprising (i) determining whether the viewing party has been pre-authorized to access the location pertaining to the particular one of the persons based at least in part on an input received from a person other than the viewing party, (ii) permitting the viewing party to access the location pertaining to the particular one of the persons when the determining (i) determines that the viewing party has been pre-authorized to access the location pertaining to the particular one of the persons, (iii) sending, when the determining (i) determines that the viewing party has not been pre-authorized to access the location pertaining to the particular one of the persons, a location access request notification to a mobile computing device for approval or disapproval of the request initiated by the viewing party, the mobile computing device receiving the location access request notification is associated with a person other than the viewing party, (iv) receiving, at the networked location monitoring system, a location access response from the mobile computing device receiving the location access request notification, and (v) permitting the viewing party to access the location pertaining to the particular one of the persons based at least in part on the location access response; and

delivering, to the viewing party, the location pertaining to the particular one of the persons provided that said permitting (ii) or said permitting (v) permits the viewing party to access the location.

2. A computer-implemented method as recited in claim **1**, wherein the viewing party must be a registered user with the networked location monitoring system to obtain the location of the particular one of the persons.

3. A computer-implemented method as recited in claim **1**, wherein said method further comprises:

causing an indicator to be displayed on a display screen of the mobile computing device corresponding to the particular one of the persons, the indicator indicating that

the location of the mobile computing device corresponding to the particular one of the persons is being monitored.

4. A computer-implemented method as recited in claim **1**, wherein said obtaining comprises:

receiving, at the networked location monitoring system, location information from the mobile computing devices;

determining the locations for the mobile computing devices based on at least the location information; and

storing, at the networked location monitoring system, the locations of the mobile computing devices.

5. A computer-implemented method as recited in claim **1**, wherein the location access request notification is provided to the mobile computing device for approval or disapproval via a wireless mechanism.

6. A computer-implemented method as recited in claim **1**, wherein the location access response indicates approval or disapproval of the location access request.

7. A computer-implemented method as recited in claim **1**, wherein the location access request notification is provided to the mobile computing device for approval or disapproval in a wireless manner, and

wherein the location access response is received at the networked location monitoring system from the mobile computing device and indicates approval or disapproval of the location access request.

8. A computer-implemented method as recited in claim **1**, wherein said determining whether the viewing party is permitted to access the location pertaining to the particular one of the persons establishes permission to access the location by way of a wireless exchange of information.

9. A computer-implemented method as recited in claim **1**, wherein the mobile computing device receiving the location access request notification corresponds to the particular one of the persons.

10. A computer-implemented method as recited in claim **1**, wherein said method further comprises:

activating an indicator at the mobile computing device corresponding to the particular one of the persons being monitored, the indicator indicating that the location of the particular one of the persons is being viewed.

11. A location monitoring system for managing access to location information of a plurality of mobile electronic devices supported by at least one wireless network, each of the mobile electronic devices being associated with and proximate to a corresponding object, said location monitoring system comprising:

a computing device operatively connectable to the wireless network, said computing device storing locations of each of the mobile electronic devices, and said computing device enabling certain users to be authorized to access the locations of the mobile electronic devices via one or more networks,

wherein in managing authorization for access to locations of the mobile electronic devices, said computing device (i) receives, from a requesting user, a request to view the location pertaining to a particular one of the objects; (ii) determines whether the requesting user is authorized to receive the location of the particular one of the objects; and (iii) delivers the location pertaining to the particular one of the objects to the requesting user provided that it is determined (ii) that the requesting user is authorized to receive such a response, and

wherein in determining (ii) whether the requesting user is authorized to receive the location of the particular one of the objects, said computing device (a) determines whether viewing of the location of the particular one of the objects is pre-authorized based at least in part on an input received from a user other than the requesting user, and (b) sends, when the viewing is determined not to be pre-authorized, a location access request notification to a mobile electronic device for approval or disapproval of the request to view the location pertaining to the particular one of the objects.

12. A location monitoring system as recited in claim **11**, wherein said computing device determines whether an electronic notification is to be sent to an authorized user based on the location of at least one of the mobile electronic devices, and

wherein said computing device sends the electronic notification to the authorized user when it has been determined that an electronic notification is to be sent to the authorized user.

13. A location monitoring system as recited in claim **11**, wherein one or more notification locations are defined by an authorized user through interaction with said computing device, wherein the one or more notification locations that have been defined are assigned location labels by the authorized user through interaction with the computing device, and wherein the location labels assigned by the authorized user are personal to the authorized user.

14. A location monitoring system as recited in claim **13**, wherein said computing device determines whether the location of the mobile electronic device pertaining to the particular one of the objects is at one of the one or more notification locations, generates a notification when it is determined that the location of the mobile electronic device is at one of the one or more notification locations, and electronically sends the notification to the authorized user.

15. A location monitoring system as recited in claim **14**, wherein each of the mobile electronic devices operates to obtain location information of its location and to forward the location information to said computing device.

16. A location monitoring system as recited in claim **14**, wherein the authorized user must be registered with said computing device before the authorized user is authorized to access the location of one or more of the mobile electronic devices or the corresponding objects,

wherein at least one attribute of the notification depends on information provided by the authorized user during the registration of that user, and

wherein the at least one attribute of the notification provided by the authorized user during registration includes a type of notification or how often notification is to be provided.

17. A location monitoring system as recited in claim **16**, wherein said computing device is a web server, and wherein at least a plurality of the mobile electronic devices are mobile communication devices having location detection capabilities.

18. A location monitoring system as recited in claim **11**, wherein one or more notification locations are defined by an authorized user through interaction with said computing device, and wherein at least one notification location that has been defined is assigned a location label by the authorized user through interaction with the computing device.

19. A location monitoring system as recited in claim **11**, wherein said computing device alerts the mobile electronic device corresponding to the particular one of the objects that the location of the mobile electronic device corresponding to the particular one of the objects is being monitored.

20. A non-transitory computer readable medium including at least computer program code stored thereon for monitoring

position of a plurality of persons via a networked location monitoring system, each of the persons having a mobile unit proximate thereto, said computer readable medium comprising:

computer program code for obtaining locations of the mobile units and thus the persons proximate thereto;

computer program code for receiving, at the networked location monitoring system, a request initiated by a viewing party to view the location pertaining to a particular one of the persons;

computer program code for determining, at the networked location monitoring system, whether the viewing party is permitted to receive the location pertaining of the particular one of the persons, said computer program code for determining comprising (i) computer program code for determining whether the viewing party has been pre-authorized to receive the location pertaining to the particular one of the persons based at least in part on an input received from a person other than the viewing party, (ii) computer program code for permitting the viewing party to receive the location pertaining to the particular one of the persons if the computer program code for determining (i) determines that the viewing party has been pre-authorized to receive the location pertaining to the particular one of the persons, (iii) computer program code for sending a location access request notification to a mobile unit for approval or disapproval of the request initiated by the viewing party, if said computer program code for determining (i) determines that the viewing party has not been pre-authorized to receive the location pertaining to the particular one of the persons, (iv) computer program code for receiving, at the networked location monitoring system, a location access response from the mobile unit receiving the location access request notification, and (v) computer program code for permitting the viewing party to receive the location pertaining to the particular one of the persons based at least in part on the location access response; and

computer program code for delivering, to the viewing party, the location pertaining to the particular one of the persons provided that said computer program code for permitting (ii) or (v) permits the viewing party to receive the location pertaining to the particular one of the persons.

21. A computer readable medium as recited in claim **20**, wherein said computer readable medium further comprises:

computer program code for causing an indicator to be displayed on a display screen of the mobile unit corresponding to the particular one of the persons, the indicator indicating that the location of the mobile unit corresponding to the particular one of the persons is being monitored.

22. A computer readable medium as recited in claim **20**, wherein said computer program code for obtaining comprises:

computer program code for receiving location information from the mobile units; and

computer program code for determining the locations for the persons corresponding to the mobile units based on at least the location information.

23. A computer readable medium as recited in claim **20**, wherein the location access request notification is provided to the mobile unit for approval or disapproval in a wireless manner.

24. A computer readable medium as recited in claim **20**, wherein the location access response indicates approval or disapproval of the location access request.

25. A computer readable medium as recited in claim **20**,

wherein the location access request notification is provided to the mobile unit for approval or disapproval in a wireless manner, and

wherein the location access response is received at the networked location monitoring system from the mobile unit and indicates approval or disapproval of the location access request.

26. A computer readable medium as recited in claim **20**, wherein said computer program code for determining whether the viewing party is permitted to receive the location pertaining of the particular one of the persons establishes permission to receive the location by way of a wireless exchange of information.

27. A computer readable medium as recited in claim **20**, wherein the mobile unit receiving the location access request notification is used by a person other than the viewing party.

28. A computer readable medium as recited in claim **20**, wherein the mobile unit receiving the location access request notification is used by the particular one of the persons.

29. A computer readable medium as recited in claim **20**, wherein said computer readable medium further comprises:

computer program code for providing a notification at the mobile unit corresponding to the particular one of the persons, the notification signaling that the location of the mobile unit corresponding to the particular one of the persons is being monitored.

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