



US010820147B2

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

(10) **Patent No.:** **US 10,820,147 B2**  
(45) **Date of Patent:** **\*Oct. 27, 2020**

(54) **MOBILE WIRELESS DEVICE PROVIDING OFF-LINE AND ON-LINE GEOGRAPHIC NAVIGATION INFORMATION**

(58) **Field of Classification Search**  
None  
See application file for complete search history.

(71) Applicant: **Traxcell Technologies, LLC**, Plano, TX (US)

(56) **References Cited**

(72) Inventors: **Mark Jefferson Reed**, Tucson, AZ (US); **Stephen Michael Palik**, Redondo Beach, CA (US)

U.S. PATENT DOCUMENTS

3,419,865 A 12/1968 Chisholm  
4,494,119 A 1/1985 Wimbush  
(Continued)

(73) Assignee: **TRAXCELL TECHNOLOGIES, LLC**, Plano, TX (US)

FOREIGN PATENT DOCUMENTS

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

CA 2 325 644 A1 5/2001  
EP 0 705 046 A2 4/1996  
(Continued)

This patent is subject to a terminal disclaimer.

OTHER PUBLICATIONS

(21) Appl. No.: **16/788,498**

U.S. Appl. No. 16/779,590, filed Feb. 1, 2020, Reed, et al.  
(Continued)

(22) Filed: **Feb. 12, 2020**

(65) **Prior Publication Data**

US 2020/0236496 A1 Jul. 23, 2020

*Primary Examiner* — Ajit Patel

**Related U.S. Application Data**

(74) *Attorney, Agent, or Firm* — Mitch Harris, Atty at Law, LLC; Andrew M. Harris

(63) Continuation of application No. 16/557,277, filed on Aug. 30, 2019, which is a continuation of application (Continued)

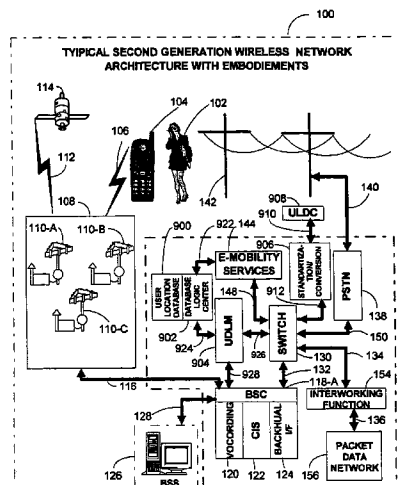
(57) **ABSTRACT**

(51) **Int. Cl.**  
**H04W 4/02** (2018.01)  
**H04W 4/029** (2018.01)  
(Continued)

A mobile device, wireless network and their method of operation provide both on-line (connected) navigation operation, as well as off-line navigation from a local database within the mobile device. Routing according to the navigation system can be controlled by traffic congestion measurements made by the wireless network that allow the navigation system to select the optimum route based on expected trip duration.

(52) **U.S. Cl.**  
CPC ..... **H04W 4/023** (2013.01); **G01S 5/0252** (2013.01); **H04B 17/318** (2015.01); **H04W 4/02** (2013.01);  
(Continued)

**24 Claims, 90 Drawing Sheets**



**Related U.S. Application Data**

No. 16/116,215, filed on Aug. 29, 2018, now Pat. No. 10,448,209, which is a continuation of application No. 15/880,852, filed on Jan. 26, 2018, now Pat. No. 10,390,175, which is a continuation of application No. 15/717,138, filed on Sep. 27, 2017, now Pat. No. 9,918,196, which is a continuation of application No. 15/468,265, filed on Mar. 24, 2017, now Pat. No. 9,888,353, which is a continuation of application No. 15/297,222, filed on Oct. 19, 2016, now Pat. No. 9,642,024, which is a continuation of application No. 14/642,408, filed on Mar. 9, 2015, now Pat. No. 9,510,320, which is a continuation of application No. 11/505,578, filed on Aug. 17, 2006, now Pat. No. 8,977,284, which is a continuation-in-part of application No. 10/255,552, filed on Sep. 24, 2002, now abandoned.

(60) Provisional application No. 60/383,528, filed on May 28, 2002, provisional application No. 60/352,761, filed on Jan. 29, 2002, provisional application No. 60/335,203, filed on Oct. 23, 2001, provisional application No. 60/383,529, filed on May 28, 2002, provisional application No. 60/391,469, filed on Jun. 26, 2002, provisional application No. 60/353,379, filed on Jan. 30, 2002, provisional application No. 60/381,249, filed on May 16, 2002, provisional application No. 60/327,327, filed on Oct. 4, 2001.

(51) **Int. Cl.**  
*H04W 8/02* (2009.01)  
*G01S 5/02* (2010.01)  
*H04W 24/02* (2009.01)  
*H04B 17/318* (2015.01)  
*H04W 64/00* (2009.01)

(52) **U.S. Cl.**  
 CPC ..... *H04W 4/029* (2018.02); *H04W 8/02* (2013.01); *H04W 24/02* (2013.01); *H04W 64/006* (2013.01)

**References Cited**

U.S. PATENT DOCUMENTS

4,689,747 A 8/1987 Kurose et al.  
 4,818,998 A 4/1989 Apsell et al.  
 4,891,650 A 1/1990 Sheffer  
 4,908,629 A 3/1990 Apsell et al.  
 4,912,705 A 3/1990 Paneth et al.  
 5,023,900 A 6/1991 Tayloe et al.  
 5,142,654 A 8/1992 Sonberg et al.  
 5,245,610 A 9/1993 Lindell  
 5,272,638 A 12/1993 Martin et al.  
 5,295,180 A 3/1994 Vendetti et al.  
 5,425,076 A 6/1995 Knippelmier  
 5,428,663 A 6/1995 Grimes et al.  
 5,465,289 A 11/1995 Kennedy, Jr.  
 5,471,649 A 11/1995 Rees et al.  
 5,479,482 A 12/1995 Grimes  
 5,497,412 A 3/1996 Lannen et al.  
 5,504,482 A 4/1996 Schreder  
 5,519,760 A 5/1996 Borkowski et al.  
 5,519,830 A 5/1996 Opoczynski  
 5,524,136 A 6/1996 Bar-Noy et al.  
 5,526,357 A 6/1996 Jandrell  
 5,543,789 A 8/1996 Behr et al.  
 5,548,583 A 8/1996 Bustamante  
 5,561,704 A 10/1996 Salimando  
 5,570,373 A 10/1996 Wing

5,625,668 A 4/1997 Loomis et al.  
 5,654,908 A 8/1997 Yokoyama  
 5,659,596 A 8/1997 Dunn  
 5,684,859 A 11/1997 Chanroo et al.  
 5,694,335 A 12/1997 Hollenberg  
 5,694,451 A 12/1997 Arinell  
 5,706,333 A 1/1998 Grenning et al.  
 5,712,899 A 1/1998 Pace, II  
 5,745,865 A 4/1998 Rostoker et al.  
 5,757,810 A 5/1998 Fall  
 5,768,686 A 6/1998 LeBlanc et al.  
 5,774,829 A 6/1998 Cisneros et al.  
 5,790,940 A 8/1998 Laborde et al.  
 5,799,154 A 8/1998 Kuriyan  
 5,802,473 A 9/1998 Rutledge et al.  
 5,806,018 A 9/1998 Smith et al.  
 5,808,566 A 9/1998 Behr et al.  
 5,812,636 A 9/1998 Tseng et al.  
 5,819,177 A 10/1998 Vucetic et al.  
 5,835,061 A 11/1998 Stewart  
 5,839,086 A 11/1998 Hirano  
 5,844,522 A 12/1998 Sheffer et al.  
 5,857,155 A 1/1999 Hill et al.  
 5,873,040 A 2/1999 Dunn et al.  
 5,875,398 A 2/1999 Snapp  
 5,878,328 A 3/1999 Chawla et al.  
 5,884,163 A 3/1999 Hardouin  
 5,890,068 A 3/1999 Fattouche et al.  
 5,895,436 A 4/1999 Savoie et al.  
 5,911,773 A 6/1999 Mutsuga et al.  
 5,920,607 A 7/1999 Berg  
 5,930,515 A 7/1999 Ducharme et al.  
 5,930,717 A 7/1999 Yost et al.  
 5,933,100 A 8/1999 Golding  
 5,933,776 A 8/1999 Kirkpatrick  
 5,951,620 A 9/1999 Ahrens et al.  
 5,952,969 A 9/1999 Hagerman et al.  
 5,959,577 A 9/1999 Fan et al.  
 5,987,329 A 11/1999 Yost et al.  
 6,014,090 A 1/2000 Rosen et al.  
 6,026,304 A 2/2000 Hilsenrath et al.  
 6,035,183 A 3/2000 Todd et al.  
 6,052,591 A 4/2000 Bhatia  
 6,052,598 A 4/2000 Rudrapatna et al.  
 6,061,561 A 5/2000 Alanara et al.  
 6,064,339 A 5/2000 Wax et al.  
 6,070,072 A 5/2000 Dorenbosch et al.  
 6,070,083 A 5/2000 Watters et al.  
 6,072,778 A 6/2000 Labeledz et al.  
 6,073,075 A 6/2000 Kondou  
 6,084,955 A 7/2000 Key et al.  
 6,088,588 A 7/2000 Osborne  
 6,088,594 A 7/2000 Kingdon et al.  
 6,091,362 A 7/2000 Stilp et al.  
 6,091,956 A 7/2000 Hollenberg  
 6,097,336 A 8/2000 Stilp  
 6,097,953 A 8/2000 Bonta  
 6,104,931 A 8/2000 Havinis et al.  
 6,111,538 A 8/2000 Schuchman et al.  
 6,111,539 A 8/2000 Mannings et al.  
 6,128,507 A 10/2000 Takai  
 6,138,003 A 10/2000 Kingdon et al.  
 6,141,565 A 10/2000 Feuerstein et al.  
 6,144,861 A 11/2000 Sundelin et al.  
 6,150,961 A 11/2000 Alewine et al.  
 6,151,505 A 11/2000 Larkins et al.  
 6,154,638 A 11/2000 Cheng et al.  
 6,157,838 A 12/2000 Di Huo et al.  
 6,157,841 A 12/2000 Bolduc et al.  
 6,163,751 A 12/2000 Van Roekel  
 6,167,275 A 12/2000 Oros et al.  
 6,188,883 B1 2/2001 Takemura  
 6,198,910 B1 3/2001 Hanley  
 6,198,935 B1 3/2001 Saha et al.  
 6,204,813 B1 3/2001 Wadell et al.  
 6,212,474 B1 4/2001 Fowler et al.  
 6,223,032 B1 4/2001 Cuffaro

(56)	<b>References Cited</b>		6,492,944 B1 *	12/2002	Stilp .....	G01S 5/0284 342/387
	U.S. PATENT DOCUMENTS					
	6,233,449 B1	5/2001	Glitho et al.			
	6,236,335 B1	5/2001	Goodwin, III			
	6,236,359 B1	5/2001	Watters et al.			
	6,236,365 B1	5/2001	LeBlanc et al.			
	6,240,365 B1	5/2001	Bunn			
	6,243,030 B1	6/2001	Levine			
	6,243,568 B1	6/2001	Detlef et al.			
	6,243,588 B1	6/2001	Koorapaty et al.			
	6,246,861 B1	6/2001	Messier et al.			
	6,249,252 B1	6/2001	Dupray			
	6,249,679 B1	6/2001	Guilbaud et al.			
	6,249,680 B1	6/2001	Wax et al.			
	6,266,013 B1	7/2001	Stilp et al.			
	6,266,014 B1	7/2001	Fattouche et al.			
	6,266,514 B1	7/2001	O'Donnell			
	6,266,615 B1	7/2001	Jin			
	6,269,246 B1	7/2001	Rao et al.			
	6,278,939 B1	8/2001	Robare et al.			
	6,278,941 B1	8/2001	Yokoyama			
	6,282,491 B1	8/2001	Bochmann et al.			
	6,285,321 B1	9/2001	Stilp et al.			
	6,285,688 B1	9/2001	Henderson et al.			
	6,292,743 B1	9/2001	Pu et al.			
	6,295,502 B1	9/2001	Hancock et al.			
	6,297,766 B1	10/2001	Koeller			
	6,298,233 B1	10/2001	Souissi et al.			
	6,298,301 B1	10/2001	Kim			
	6,298,306 B1	10/2001	Suarez et al.			
	6,307,573 B1	10/2001	Barros			
	6,308,073 B1	10/2001	Petty et al.			
	6,313,786 B1	11/2001	Sheynblat et al.			
	6,314,294 B1	11/2001	Benveniste			
	6,314,365 B1	11/2001	Smith			
	6,317,596 B1	11/2001	Elwin			
	6,317,604 B1	11/2001	Kovach, Jr. et al.			
	6,317,605 B1	11/2001	Sakuma			
	6,317,684 B1	11/2001	Roeseler et al.			
	6,320,534 B1	11/2001	Goss			
	6,321,092 B1	11/2001	Fitch et al.			
	6,330,452 B1	12/2001	Fattouche et al.			
	6,334,047 B1	12/2001	Andersson et al.			
	6,334,089 B2	12/2001	Hessing			
	6,336,073 B1	1/2002	Ihara et al.			
	6,341,255 B1	1/2002	Lapidot			
	6,343,290 B1	1/2002	Cossins et al.			
	6,351,221 B1	2/2002	Phillips et al.			
	6,353,902 B1	3/2002	Kulatunge et al.			
	6,360,102 B1	3/2002	Havinis et al.			
	6,362,783 B1	3/2002	Sigiura et al.			
	6,374,177 B1	4/2002	Lee et al.			
	6,377,810 B1	4/2002	Geiger et al.			
	6,385,458 B1	5/2002	Papadimitriou et al.			
	6,385,465 B1	5/2002	Yoshioka			
	6,393,294 B1	5/2002	Perez-Breva et al.			
	6,401,035 B2	6/2002	Jin			
	6,405,123 B1	6/2002	Rennard et al.			
	6,421,607 B1	7/2002	Gee et al.			
	6,430,397 B1	8/2002	Willrett			
	6,438,490 B2	8/2002	Ohta			
	6,442,391 B1	8/2002	Johansson et al.			
	6,442,393 B1	8/2002	Hogan			
	6,442,394 B1	8/2002	Valentine et al.			
	6,445,916 B1	9/2002	Rahman			
	6,445,917 B1	9/2002	Bark et al.			
	6,453,152 B1	9/2002	Hong et al.			
	6,453,181 B1	9/2002	Challa et al.			
	6,456,234 B1	9/2002	Johnson			
	6,456,852 B2	9/2002	Bar et al.			
	6,456,854 B1	9/2002	Chern et al.			
	6,466,565 B1	10/2002	Wax et al.			
	6,466,790 B2	10/2002	Haumont et al.			
	6,484,093 B1	11/2002	Ito et al.			
	6,487,394 B1	11/2002	Ue et al.			
	6,496,776 B1	12/2002	Blumberg et al.			
	6,505,048 B1	1/2003	Moles et al.			
	6,505,049 B1	1/2003	Dorenbosch			
	6,505,114 B2	1/2003	Luciani			
	6,515,595 B1	2/2003	Obradovich et al.			
	6,516,195 B1	2/2003	Zadeh et al.			
	6,522,888 B1	2/2003	Garceran et al.			
	6,526,283 B1	2/2003	Jang			
	6,603,966 B1	2/2003	Sheffield			
	6,539,229 B1	3/2003	Ali			
	6,542,816 B1	4/2003	Ito et al.			
	6,553,308 B1	4/2003	Uhlmann et al.			
	6,557,139 B2	4/2003	Bohnke			
	6,560,461 B1	5/2003	Fomukong et al.			
	6,580,914 B1	6/2003	Smith			
	6,587,690 B1	7/2003	Di Huo et al.			
	6,594,483 B2	7/2003	Nykanen et al.			
	6,597,906 B1	7/2003	Van Leeuwen et al.			
	6,603,977 B1	8/2003	Walsh et al.			
	6,609,005 B1	8/2003	Chern			
	6,611,500 B1	8/2003	Clarkson et al.			
	6,614,363 B1	9/2003	Behr et al.			
	6,615,131 B1	9/2003	Rennard et al.			
	6,631,267 B1	10/2003	Clarkson et al.			
	6,633,761 B1	10/2003	Singhal et al.			
	6,636,744 B1	10/2003	Da			
	6,640,101 B1	10/2003	Daniel			
	6,650,896 B1	11/2003	Haymes et al.			
	6,650,902 B1	11/2003	Richton			
	6,654,682 B2	11/2003	Kane et al.			
	6,654,683 B2	11/2003	Jin et al.			
	6,662,014 B1	12/2003	Walsh			
	6,662,023 B1	12/2003	Helle			
	6,662,105 B1	12/2003	Tada et al.			
	6,665,676 B2	12/2003	Twig et al.			
	6,671,646 B2	12/2003	Manegold et al.			
	6,674,403 B2	1/2004	Gray et al.			
	6,677,894 B2	1/2004	Sheynblat et al.			
	6,678,516 B2	1/2004	Nordman et al.			
	6,680,694 B1	1/2004	Knockeart et al.			
	6,687,504 B1	2/2004	Raith			
	6,700,534 B2	3/2004	Harris			
	6,716,101 B1	4/2004	Meadows et al.			
	6,721,542 B1	4/2004	Anttila et al.			
	6,725,155 B1	4/2004	Takahashi et al.			
	6,725,156 B2	4/2004	Kaplan			
	6,735,454 B1	5/2004	Yu et al.			
	6,738,711 B2	5/2004	Ohmura et al.			
	6,745,011 B1	6/2004	Hendrickson et al.			
	6,751,443 B2	6/2004	Haymes et al.			
	6,757,543 B2	6/2004	Moran et al.			
	6,757,718 B1	6/2004	Halverson et al.			
	6,775,544 B2	8/2004	Ficarra			
	6,782,256 B2	8/2004	Engholm et al.			
	6,795,710 B1	9/2004	Creemer			
	6,798,358 B2	9/2004	Joyce et al.			
	6,799,047 B1	9/2004	Bahl et al.			
	6,799,049 B1	9/2004	Zellner et al.			
	6,804,626 B2	10/2004	Manegold et al.			
	6,816,720 B2	11/2004	Hussain et al.			
	6,836,667 B1	12/2004	Smith, Jr.			
	6,838,998 B1	1/2005	Brown et al.			
	6,839,552 B1	1/2005	Martin			
	6,839,554 B2	1/2005	McDowell et al.			
	6,839,560 B1	1/2005	Bahl et al.			
	6,842,431 B2	1/2005	Clarkson et al.			
	6,842,620 B2	1/2005	Smith et al.			
	6,845,246 B1	1/2005	Steer			
	6,847,889 B2	1/2005	Park et al.			
	6,847,916 B1	1/2005	Ying			
	6,847,969 B1	1/2005	Mathai et al.			
	6,850,736 B2	2/2005	McCune, Jr.			
	6,850,766 B2	2/2005	Lau et al.			
	6,853,911 B1	2/2005	Sakarya			
	6,853,915 B2	2/2005	Hubschneider et al.			

(56)

## References Cited

## U.S. PATENT DOCUMENTS

6,901,264	B2	5/2005	Myr	7,564,375	B2	7/2009	Brinton et al.
6,904,013	B2	6/2005	Skoog et al.	7,570,958	B2	8/2009	Krasner et al.
6,907,252	B2	6/2005	Papadias et al.	7,574,222	B2	8/2009	Sawada et al.
6,912,376	B1	6/2005	Smith et al.	7,574,230	B1	8/2009	Oh et al.
6,925,300	B2	8/2005	Horne	7,603,411	B1	10/2009	Davies et al.
6,931,256	B2	8/2005	Mandyam	7,616,950	B2	11/2009	Pearson et al.
6,941,220	B2	9/2005	Le et al.	7,634,266	B2	12/2009	McDougall et al.
6,944,447	B2	9/2005	Portman et al.	7,664,492	B1	2/2010	Lee et al.
6,944,452	B2	9/2005	Coskun et al.	7,689,240	B2	3/2010	Anderson
6,947,837	B2	9/2005	Fukushima et al.	7,808,369	B2	10/2010	Brinton et al.
6,950,745	B2	9/2005	Agnew et al.	7,813,741	B2	10/2010	Hendrey et al.
6,952,181	B2	10/2005	Karr et al.	7,853,267	B2	12/2010	Jensen
6,961,562	B2	11/2005	Ross	7,996,017	B2	8/2011	Vanttinen
6,970,922	B1	11/2005	Spector	8,019,581	B2	9/2011	Sheha et al.
6,973,622	B1	12/2005	Rappaport et al.	RE42,937	E	11/2011	Want et al.
6,985,839	B1	1/2006	Motamedi et al.	8,082,096	B2	12/2011	Dupray
6,985,901	B1	1/2006	Sachse et al.	8,107,608	B2	1/2012	Sheha et al.
7,000,015	B2	2/2006	Moore et al.	8,199,696	B2	6/2012	Sarkar et al.
7,003,264	B2	2/2006	Fodor et al.	8,218,507	B2	7/2012	Palmer et al.
7,020,475	B2	3/2006	Bahl et al.	8,244,307	B1	8/2012	Tilgner et al.
7,024,187	B2	4/2006	Moles et al.	8,509,412	B2	8/2013	Sheha et al.
7,024,205	B1	4/2006	Hose	8,862,106	B2	10/2014	Salisbury et al.
7,043,254	B2	5/2006	Chawla et al.	8,977,284	B2	3/2015	Reed
7,072,648	B2	7/2006	Ichikawa	8,994,591	B2	3/2015	Dupray et al.
7,072,667	B2	7/2006	Olrik et al.	9,134,398	B2	9/2015	Dupray et al.
7,072,676	B1	7/2006	Hessing et al.	9,451,019	B2	9/2016	Herz et al.
7,076,244	B2	7/2006	Lazaridis et al.	9,510,320	B2	11/2016	Reed et al.
7,079,945	B1	7/2006	Kaplan	9,528,843	B2	12/2016	Pu et al.
7,082,365	B2	7/2006	Sheha et al.	9,549,388	B2	1/2017	Reed et al.
7,085,555	B2	8/2006	Zellner et al.	9,642,024	B2	5/2017	Reed et al.
7,089,264	B1	8/2006	Guido et al.	9,888,353	B2	2/2018	Reed et al.
7,093,286	B1	8/2006	King	9,918,196	B2	3/2018	Reed et al.
7,096,160	B2	8/2006	Skidmore et al.	10,390,175	B2	8/2019	Reed et al.
7,103,368	B2	9/2006	Teshima	10,448,209	B2	10/2019	Reed et al.
7,115,990	B2	10/2006	Kinsman	2001/0036224	A1	11/2001	Demello et al.
7,116,990	B2	10/2006	Maanoja	2001/0044310	A1	11/2001	Lincke
7,117,085	B2	10/2006	Buecher et al.	2001/0049263	A1	12/2001	Zhang
7,117,121	B2	10/2006	Brinton et al.	2002/0002504	A1	1/2002	Engel et al.
7,120,392	B2	10/2006	Chu et al.	2002/0032521	A1	3/2002	Machii et al.
7,120,431	B1	10/2006	Huo et al.	2002/0035605	A1	3/2002	McDowell et al.
7,123,918	B1	10/2006	Goodman	2002/0052786	A1	5/2002	Kim et al.
7,126,527	B1	10/2006	Bajikar	2002/0072358	A1	6/2002	Schneider et al.
7,130,630	B1	10/2006	Enzmann et al.	2002/0091568	A1	7/2002	Kraft et al.
7,133,909	B2	11/2006	Bahl	2002/0111154	A1	8/2002	Eldering et al.
7,142,863	B1	11/2006	Smith et al.	2002/0115453	A1	8/2002	Poulin et al.
7,149,201	B2	12/2006	Hunzinger	2002/0152303	A1	10/2002	Dispensa
7,149,625	B2	12/2006	Mathews et al.	2002/0155816	A1	10/2002	Fodor et al.
7,151,940	B2	12/2006	Vanttinen et al.	2002/0161633	A1	10/2002	Jacob et al.
7,158,880	B2	1/2007	Geiger et al.	2002/0164998	A1	11/2002	Younis
7,162,367	B2	1/2007	Lin et al.	2002/0169539	A1	11/2002	Menard et al.
7,164,883	B2	1/2007	Rappaport et al.	2002/0173318	A1	11/2002	Dyer
7,164,921	B2	1/2007	Owens et al.	2002/0184418	A1	12/2002	Blight
7,181,225	B1	2/2007	Moton, Jr. et al.	2002/0194498	A1	12/2002	Blight et al.
7,203,503	B2	4/2007	Cedervall et al.	2002/0198985	A1	12/2002	Fraenkel et al.
7,203,752	B2	4/2007	Rice et al.	2003/0003900	A1	1/2003	Goss et al.
7,213,048	B1	5/2007	Parupudi et al.	2003/0004743	A1	1/2003	Callegari
7,249,100	B2	7/2007	Murto et al.	2003/0005316	A1	1/2003	Girard
7,260,473	B2	8/2007	Abe et al.	2003/0040340	A1	2/2003	Smethers
7,274,332	B1	9/2007	Dupray	2003/0054811	A1	3/2003	Han et al.
7,280,803	B2	10/2007	Nelson	2003/0065442	A1	4/2003	Touney
7,319,847	B2	1/2008	Xanthos et al.	2003/0069043	A1	4/2003	Chhaochharia et al.
7,333,794	B2	2/2008	Zappala	2003/0091017	A1	5/2003	Davenport et al.
7,333,820	B2	2/2008	Sheha et al.	2003/0134648	A1	7/2003	Reed
7,343,165	B2	3/2008	Obradovich	2003/0146871	A1	8/2003	Karr et al.
7,362,229	B2	4/2008	Brinton et al.	2003/0199260	A1	10/2003	Casey et al.
7,366,522	B2	4/2008	Thomas	2004/0093289	A1	5/2004	Bodin
7,389,179	B2	6/2008	Jin et al.	2004/0246147	A1	12/2004	Von Grabe
7,409,429	B2	8/2008	Kaufman et al.	2005/0043036	A1	2/2005	Ioppe et al.
7,421,486	B1	9/2008	Parupudi et al.	2005/0282540	A1	12/2005	Motamedi et al.
7,444,156	B2	10/2008	Boss et al.	2015/0309295	A1	10/2015	Cocker et al.
7,519,372	B2	4/2009	MacDonald et al.	2020/0015039	A1	1/2020	Reed et al.
7,525,484	B2	4/2009	Dupray et al.				
7,546,128	B2	6/2009	Smith et al.				

## FOREIGN PATENT DOCUMENTS

EP	1 028 543	A1	8/2000
EP	1 071 295	A2	1/2001
EP	1 126 376	A1	8/2001

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

GB	2 252 475	A	8/1992
GB	2 357 010	A	6/2001
JP	H07-250381	A	9/1995
JP	H09287965	A	11/1997
JP	H11-027729	A	1/1999
JP	2000-091982		3/2000
JP	2000298429	A	10/2000
WO	WO 1990004293	A1	4/1990
WO	WO 1994027398	A1	11/1994
WO	WO 1995012268	A1	5/1995
WO	WO 1997024626	A2	7/1997
WO	WO 1998016077	A2	4/1998
WO	WO 1999012228	A2	3/1999
WO	WO 1999027746	A1	6/1999
WO	WO 1999052316	A1	10/1999
WO	WO 2000010296	A2	2/2000
WO	WO 2000028756	A1	5/2000
WO	WO 2000040992	A1	7/2000
WO	WO 2000041402	A2	7/2000
WO	WO 2000067450	A1	11/2000
WO	WO 2000077949	A1	12/2000
WO	WO 2001019102	A1	3/2001
WO	WO 2001046710	A2	6/2001
WO	WO 2001048624	A1	7/2001
WO	WO 2001076093	A1	10/2001
WO	WO 2002005486	A2	1/2002
WO	WO 2002082843	A1	10/2002

## OTHER PUBLICATIONS

Notice of Allowance in U.S. Appl. No. 15/880,852 dated Jul. 31, 2018, 69 pages (pp. 1-69 in pdf).

Office Action in U.S. Appl. No. 15/297,222 dated Dec. 14, 2016, 23 pages (pp. 1-23 in pdf).

Notice of Allowance in U.S. Appl. No. 15/297,222 dated Jan. 12, 2017, 6 pages (pp. 1-6 in pdf).

Office Action in U.S. Appl. No. 15/099,960 dated Jun. 28, 2016, 15 pages (pp. 1-15 in pdf).

Notice of Allowance in U.S. Appl. No. 15/099,960 dated Nov. 29, 2016, 38 pages (pp. 1-38 in pdf).

Office Action in U.S. Appl. No. 14/642,408 dated Aug. 10, 2016, 21 pages (pp. 1-21 in pdf).

Notice of Allowance in U.S. Appl. No. 14/642,408 dated Sep. 28, 2016, 6 pages (pp. 1-6 in pdf).

Office Action in U.S. Appl. No. 11/505,578 dated Jul. 7, 2009, 7 pages (pp. 1-7 in pdf).

Office Action in U.S. Appl. No. 11/505,578 dated May 12, 2010, 4 pages (pp. 1-4 in pdf).

Final Office Action in U.S. Appl. No. 11/505,578 dated Nov. 9, 2010, 6 pages (pp. 1-6 in pdf).

Office Action in U.S. Appl. No. 11/505,578 dated Aug. 18, 2011, 7 pages (pp. 1-7 in pdf).

Office Action in U.S. Appl. No. 11/505,578 dated Mar. 28, 2012, 7 pages (pp. 1-7 in pdf).

Final Office Action in U.S. Appl. No. 11/505,578 dated Dec. 12, 2012, 8 pages (pp. 1-8 in pdf).

Notice of Allowance in U.S. Appl. No. 11/505,578 dated May 6, 2014, 13 pages (pp. 1-13 in pdf).

Office Action in U.S. Appl. No. 10/255,552, dated Aug. 10, 2005, 12 pages (pp. 1-12 in pdf).

Final Office Action U.S. Appl. No. 10/255,552, dated Mar. 7, 2006, 19 pages (pp. 1-19 in pdf).

Lui, et al., "Location Updates and Probabilistic Tracking Algorithms for Mobile Cellular Networks", Fourth International Symposium on Parallel Architectures, Algorithms, and Networks, Jun. 1999, 6 pages (pp. 1-6 in pdf), US.

Krishna, "Performance Issues in Mobile Wireless Networks", Office

Anonymous, "Ladot's Adaptive Traffic Control System (ATCS)", Presentation at the TRB Workshop on Adaptive Traffic Signal Control Systems, Jan. 9, 2000.

Vucetic, et al. "Signal Monitoring System for Wireless Network Operation and Management", Dynamic Telecommunications, Inc., 0-7803-5030-8/98, 1998, pp. 296-300, IEEE.

3rd Generation Partnership Project: Technical Specification Group Radio Access Network: RRC Protocol Specification, 3GPP TS 25.331, V3.6.0 (Mar. 2001), Release 1999, 2001, pp. 1-708, France.

3rd Generation Partnership Project: Technical Specification Group Services and System Aspects: Functional Stage 2 Description of LCS (Release 4), 3G TS 23.271, v 2.0.0 (Dec. 2000) 2000, pp. 1-57, FR.

Bennington, et al. "Wireless Andrew: Experience Building a High Speed, Campus-Wide Wireless Data Network," MOBICOM 97, ACM 0-89791-988-2/97/9, 1997, pp. 55-65, Budapest, Hungary.

Anhalt, et al., "Toward Context Aware Computing: Experiences and Lessons," IEEE Intelligent Systems, 1094-7167/01, May/Jun. 2001, pp. 38-46. IEEE.

Eckhardt, et al. "Measurement and Analysis of the Error Characteristics of an In-Building Wireless Network", Proceedings of SIGCOMM '96, Aug. 1996, pp. 1-12 (12 pages in pdf), Stanford, CA.

He, et al., "WaveGuard: Secure Location Service for Wireless Andrew," Wireless 2001, 13th International Conference on Wireless Communications, Proceedings vol. 1, Jul. 9-11, 2001, pp. 252-259, CA.

Hills, "Large-Scale Wireless LAN Design," IEEE Communications Magazine, 0163-6804/01, Nov. 2001, pp. 98-104, IEEE.

Hills, "Bringing Mobile Computing to a University Community of 10,000," IEEE Spectrum, 0018-9235/99, Jun. 1999, pp. 49-53, IEEE.

Hills, et al., "Seamless access to multiple wireless data networks; A Wireless Data Network Infrastructure at Carnegie Mellon University," IEEE Personal Communications, vol. 3, No. 1, 1070-9916/96, Feb. 1996, pp. 56-63, IEEE.

Johnson, et al., "Truly seamless wireless and mobile host networking; Protocols for Adaptive Wireless and Mobile Networking," IEEE Personal Communications, 1070-9916/96, Feb. 1996, pp. 34-42, IEEE.

Small, et al., "Determining User Location for Context Aware Computing Through the Use of a Wireless LAN Infrastructure", 2000, 8 pages (pp. 1-8 in pdf), Institute for Complex Engineered Systems, Carnegie Mellon University, Pittsburgh, PA.

Hassan, "Cellular Optimization", Cellular Business, Sep. 1995, pp. 122-126.

Miletic, "Looking for Trouble", Wireless Review, Jan. 15, 2001, pp. 52-54.

Bisdikian, et al., "Enabling Location-Based Applications", WMC 01, ACM 2001 1-58113-376-6/01/07, 2001, pp. 38-42, Rome, Italy.

Ateniese, et al. "Untraceable Mobility or How to Travel Incognito", Computer Networks 31, 1389-1286/99, 1999, pp. 871-884, Elsevier Science B.V.

Lee, et al., "Enhanced privacy and authentication for the global system for mobile communications", Wireless Networks 5, 1999, pp. 231-243, Science Publishers, J.C. Baltzer.

Bera, et al., "Performance Analysis of Dynamic Location Updation Strategies for Mobile Users", Proc. of 2000 International Conference on Distributed Computing Systems, Apr. 2000, 8 pages (pp. 1-8 in pdf), Taiwan.

Hepsaydir, "Mobile Positioning in CDMA Cellular Networks", 38th IEEE Vehicular Technology Conference, 0-7803-5435-4/99, Feb. 1999, pp. 795-799, IEEE.

Xie, et al., "Dynamic Location Area Management and Performance Analysis", IEEE, 0-7803-1266-x/93, 1993, pp. 536-539, IEEE.

Leonhardt, et al. "Towards a general location service for mobile environments", Proceedings of Third International Workshop on Services in Distributed and Networked Environments, Jun. 1996, 8 pages (pp. 1-8 in pdf), Macau.

Global System for Mobile Communications, "Digital cellular tele-



# Explore Litigation Insights

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

## Real-Time Litigation Alerts



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

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

## Advanced Docket Research



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

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

## Analytics At Your Fingertips



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

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

## API

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

## LAW FIRMS

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

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

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.