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(54) **VEHICLE EVENT RECORDER SYSTEMS AND NETWORKS HAVING INTEGRATED CELLULAR WIRELESS COMMUNICATIONS SYSTEMS**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

673,203	A	4/1901	Freund
673,795	A	5/1901	Hammer
673,907	A	5/1901	Johnson
676,075	A	6/1901	McDougall
679,511	A	7/1901	Richards
681,036	A	8/1901	Burg
681,283	A	8/1901	Waynick
681,998	A	9/1901	Swift
683,155	A	9/1901	Thompson
683,214	A	9/1901	Mansfield

(Continued)

FOREIGN PATENT DOCUMENTS

CA	2469728 A1	12/2005
CA	2692415	8/2011

(Continued)

OTHER PUBLICATIONS

Non-Final Office Action mailed Nov. 27, 2013 in U.S. Appl. No. 13/957,810, filed Aug. 2, 2013.

(Continued)

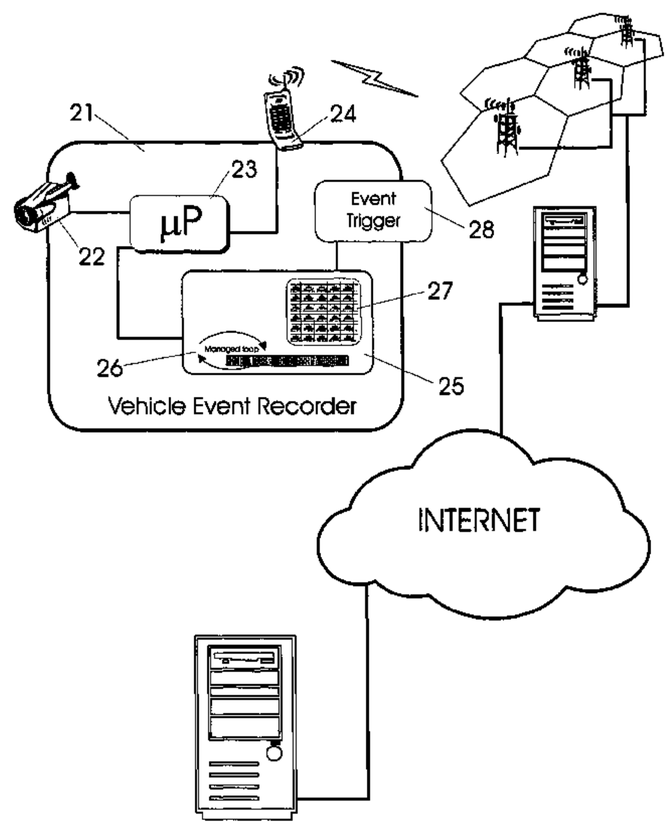
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(57) **ABSTRACT**

Vehicle event recorder systems are arranged to be in constant communication with remote servers and administrators via mobile wireless cellular networks. Vehicle event recorders equipped with video cameras capture video and other data records of important events relating to vehicle use. These data are then transmitted over special communications networks having very high coverage space but limited bandwidth. A vehicle may be operated over very large region while maintaining continuous communications connections with a remote fixed server. As such, systems of these inventions may be characterized as including a mobile unit having: a video camera; a microprocessor; memory; an event trigger; and mobile wireless transceivers, and a fixed network portion including: mobile wireless cellular network, a protocol translation gateway, the Internet and an application-specific server.

5 Claims, 5 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

684,276	A	10/1901	Lonergan
685,082	A	10/1901	Wood
685,969	A	11/1901	Campbell
686,545	A	11/1901	Selph
689,849	A	12/1901	Brown
691,982	A	1/1902	Sturgis
692,834	A	2/1902	Davis
694,781	A	3/1902	Prinz
2,943,141	A	6/1960	Knight
3,634,866	A	1/1972	Meyer
3,781,824	A	12/1973	Caiati
3,812,287	A	5/1974	Lemelson
3,885,090	A	5/1975	Rosenbaum
3,992,656	A	11/1976	Joy
4,054,752	A	10/1977	Dennis
4,258,421	A	3/1981	Juhasz
4,271,358	A	6/1981	Schwarz
4,276,609	A	6/1981	Patel
4,280,151	A	7/1981	Tsunekawa
4,281,354	A	7/1981	Conte
4,401,976	A	8/1983	Stadelmayr
4,409,670	A	10/1983	Herndon
4,420,773	A	12/1983	Toyoda
4,425,097	A	1/1984	Owens
4,456,931	A	6/1984	Toyoda
4,489,351	A	12/1984	d'Alayer de Costemore
4,496,995	A	1/1985	Colles
4,500,868	A	2/1985	Tokitsu
4,528,547	A	7/1985	Rodney
4,533,962	A	8/1985	Decker
4,558,379	A	12/1985	Hutter
4,588,267	A	5/1986	Pastore
4,593,313	A	6/1986	Nagasaki
4,621,335	A	11/1986	Bluish
4,625,210	A	11/1986	Sagl
4,630,110	A	12/1986	Cotton
4,632,348	A	12/1986	Keesling
4,638,289	A	1/1987	Zottnik
4,646,241	A	2/1987	Ratchford
4,651,143	A	3/1987	Yamanaka
4,671,111	A	6/1987	Lemelson
4,718,685	A	1/1988	Kawabe
4,754,255	A	6/1988	Sanders
4,758,888	A	7/1988	Lapidot
4,763,745	A	8/1988	Eto
4,785,474	A	11/1988	Bernstein
4,789,904	A	12/1988	Peterson
4,794,566	A	12/1988	Richards
4,804,937	A	2/1989	Barbiaux
4,806,931	A	2/1989	Nelson
4,807,096	A	2/1989	Skogler
4,814,896	A	3/1989	Heitzman
4,837,628	A	6/1989	Sasaki
4,839,631	A	6/1989	Tsuji
4,843,463	A	6/1989	Michetti
4,843,578	A	6/1989	Wade
4,853,856	A	8/1989	Hanway
4,853,859	A	8/1989	Morita
4,866,616	A	9/1989	Takeuchi
4,876,597	A	10/1989	Roy
4,883,349	A	11/1989	Mittelhaeuser
4,896,855	A	1/1990	Furnish
4,926,331	A	5/1990	Windle
4,930,742	A	6/1990	Schofield
4,936,533	A	6/1990	Adams
4,939,652	A	7/1990	Steiner
4,942,464	A	7/1990	Milatz
4,945,244	A	7/1990	Castleman
4,949,186	A	8/1990	Peterson
4,980,913	A	12/1990	Skret
4,987,541	A	1/1991	Levente
4,992,943	A	2/1991	McCracken
5,012,335	A	4/1991	Cohodar
5,027,104	A	6/1991	Reid
5,046,007	A	9/1991	McCrery
5,050,166	A	9/1991	Cantoni
5,056,056	A	10/1991	Gustin
5,057,820	A	10/1991	Markson
5,096,287	A	3/1992	Kakinami
5,100,095	A	3/1992	Haan
5,111,289	A	5/1992	Lucas
5,140,434	A	8/1992	Van
5,140,436	A	8/1992	Blessinger
5,144,661	A	9/1992	Shamosh
5,178,448	A	1/1993	Adams
5,185,700	A	2/1993	Bezos
5,196,938	A	3/1993	Blessinger
5,223,844	A	6/1993	Mansell
5,224,211	A	6/1993	Roe
5,262,813	A	11/1993	Scharton
5,283,433	A	2/1994	Tsien
5,294,978	A	3/1994	Katayama
5,305,214	A	4/1994	Komatsu
5,305,216	A	4/1994	Okura
5,308,247	A	5/1994	Dyrdek
5,309,485	A	5/1994	Chao
5,311,197	A	5/1994	Sorden
5,321,753	A	6/1994	Gritton
5,327,288	A	7/1994	Wellington
5,330,149	A	7/1994	Haan
5,343,527	A	8/1994	Moore
5,353,023	A	10/1994	Mitsugi
5,361,326	A	11/1994	Aparicio
5,387,926	A	2/1995	Bellan
5,388,045	A	2/1995	Kamiya
5,388,208	A	2/1995	Weingartner
5,404,330	A	4/1995	Lee
5,408,330	A	4/1995	Squicciarini
5,422,543	A	6/1995	Weinberg
5,430,431	A	7/1995	Nelson
5,430,432	A	7/1995	Camhi
5,435,184	A	7/1995	Pineroli
5,445,024	A	8/1995	Riley
5,445,027	A	8/1995	Zoerner
5,446,659	A	8/1995	Yamawaki
5,455,625	A	10/1995	Englander
5,455,716	A	10/1995	Suman
5,465,079	A	11/1995	Bouchard
5,473,729	A	12/1995	Bryant
5,477,141	A	12/1995	Naether
5,495,242	A	2/1996	Kick
5,495,243	A	2/1996	McKenna
5,497,419	A	3/1996	Hill
5,499,182	A	3/1996	Ousborne
5,504,482	A	4/1996	Schreder
5,513,011	A	4/1996	Matsumoto
5,515,285	A	5/1996	Garrett
5,521,633	A	5/1996	Nakajima
5,523,811	A	6/1996	Wada
5,526,269	A	6/1996	Ishibashi
5,530,420	A	6/1996	Tsuchiya
5,532,678	A	7/1996	Kin
5,537,156	A	7/1996	Katayama
5,539,454	A	7/1996	Williams
5,541,590	A	7/1996	Nishio
5,544,060	A	8/1996	Fujii
5,546,191	A	8/1996	Hibi
5,546,305	A	8/1996	Kondo
5,548,273	A	8/1996	Nicol
5,552,990	A	9/1996	Ihara
5,559,496	A	9/1996	Dubats
5,568,211	A	10/1996	Bamford
5,570,087	A	10/1996	Lemelson
5,570,127	A	10/1996	Schmidt
5,574,424	A	11/1996	Nguyen
5,574,443	A	11/1996	Hsieh
D376,571	S	12/1996	Kokat
5,581,464	A	12/1996	Woll
5,586,130	A	12/1996	Doyle
5,590,948	A	1/1997	Moreno
5,596,382	A	1/1997	Bamford
5,600,775	A	2/1997	King
5,608,272	A	3/1997	Tanguay
5,610,580	A	3/1997	Lai

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,612,686	A		3/1997	Takano
5,631,638	A		5/1997	Kaspar
5,638,273	A		6/1997	Coiner
5,642,106	A		6/1997	Hancock
5,646,856	A		7/1997	Kaesser
5,652,706	A		7/1997	Morimoto
RE35,590	E		8/1997	Bezos
5,654,892	A		8/1997	Fujii
5,659,355	A		8/1997	Barron
5,666,120	A		9/1997	Kline
5,667,176	A		9/1997	Zamarripa
5,669,698	A		9/1997	Veldman
5,671,451	A		9/1997	Takahashi
5,677,979	A		10/1997	Squicciarini
5,680,117	A		10/1997	Arai
5,680,123	A		10/1997	Lee
5,686,889	A		11/1997	Hillis
5,689,442	A		11/1997	Swanson
5,696,705	A		12/1997	Zykan
5,706,362	A		1/1998	Yabe
5,706,909	A		1/1998	Bevins
5,712,679	A		1/1998	Coles
5,717,456	A		2/1998	Rudt
5,719,554	A		2/1998	Gagnon
5,781,145	A		7/1998	Williams
5,784,007	A		7/1998	Pepper
5,784,021	A		7/1998	Oliva
5,784,521	A		7/1998	Nakatani
5,790,403	A		8/1998	Nakayama
5,790,973	A		8/1998	Blaker
5,793,308	A		8/1998	Rosinski
5,793,420	A		8/1998	Schmidt
5,793,739	A		8/1998	Tanaka
5,793,985	A		8/1998	Natarajan
5,794,165	A		8/1998	Minowa
5,797,134	A		8/1998	McMillan
5,798,458	A		8/1998	Monroe
5,800,040	A		9/1998	Santo
5,802,545	A		9/1998	Coverdill
5,802,727	A		9/1998	Blank
5,805,079	A		9/1998	Lemelson
5,813,745	A		9/1998	Fant
5,815,071	A		9/1998	Doyle
5,815,093	A	*	9/1998	Kikinis 340/937
5,819,198	A		10/1998	Peretz
5,825,284	A		10/1998	Dunwoody
5,825,412	A		10/1998	Hobson
5,844,505	A		12/1998	Van
5,877,897	A		3/1999	Schofield
5,896,167	A		4/1999	Omae
5,897,606	A		4/1999	Miura
5,899,956	A		5/1999	Chan
5,901,806	A		5/1999	Takahashi
5,914,748	A		6/1999	Parulski
5,919,239	A		7/1999	Fraker
5,926,210	A		7/1999	Hackett
5,928,291	A		7/1999	Jenkins
5,938,321	A		8/1999	Bos
5,946,404	A		8/1999	Bakshi
5,948,038	A		9/1999	Daly
5,959,367	A		9/1999	Ofarrell
5,978,017	A		11/1999	Tino
6,002,326	A		12/1999	Turner
6,006,148	A		12/1999	Strong
6,008,723	A		12/1999	Yassan
6,008,841	A		12/1999	Charlson
6,009,370	A		12/1999	Minowa
6,011,492	A		1/2000	Garesche
6,028,528	A		2/2000	Lorenzetti
6,037,860	A		3/2000	Zander
6,037,977	A		3/2000	Peterson
6,049,079	A		4/2000	Noordam
6,060,989	A		5/2000	Gehlot
6,064,792	A		5/2000	Fox
6,067,488	A		5/2000	Tano
6,076,026	A		6/2000	Jambhekar
6,084,870	A		7/2000	Wooten
6,088,635	A		7/2000	Cox et al.
6,092,008	A		7/2000	Bateman
6,092,193	A		7/2000	Loomis
6,100,811	A		8/2000	Hsu
6,111,254	A		8/2000	Eden
6,118,768	A		9/2000	Bhatia
6,122,738	A		9/2000	Millard
6,141,611	A		10/2000	MacKey
6,144,296	A		11/2000	Ishida
6,147,598	A		11/2000	Murphy
6,151,065	A		11/2000	Steed
6,163,338	A		12/2000	Johnson
6,163,749	A		12/2000	McDonough
6,167,186	A		12/2000	Kawasaki
6,181,373	B1		1/2001	Coles
6,185,490	B1		2/2001	Ferguson
6,195,605	B1		2/2001	Tabler
6,200,139	B1		3/2001	Clapper
6,208,919	B1		3/2001	Barkesseh
6,211,907	B1		4/2001	Scaman
6,218,960	B1		4/2001	Ishikawa
6,246,933	B1		6/2001	Bague
6,246,934	B1		6/2001	Otake
6,252,544	B1		6/2001	Hoffberg
6,253,129	B1		6/2001	Jenkins
6,259,475	B1		7/2001	Ramachandran
6,263,265	B1		7/2001	Fera
6,298,290	B1		10/2001	Abe et al.
6,300,875	B1	*	10/2001	Schafer 340/573.1
6,333,759	B1		12/2001	Mazzilli
6,337,622	B1		1/2002	Sugano
6,349,250	B1		2/2002	Hart
6,353,734	B1		3/2002	Wright
6,356,823	B1		3/2002	Iannotti
6,360,147	B1		3/2002	Lee
6,366,207	B1		4/2002	Murphy
6,389,339	B1		5/2002	Just
6,389,340	B1		5/2002	Rayner
6,405,112	B1		6/2002	Rayner
6,405,132	B1		6/2002	Breed
6,408,232	B1		6/2002	Cannon
6,411,874	B2		6/2002	Morgan et al.
6,421,080	B1		7/2002	Lambert
6,434,510	B1		8/2002	Callaghan
6,449,540	B1		9/2002	Rayner
6,456,321	B1	*	9/2002	Ito et al. 348/143
6,459,988	B1		10/2002	Fan
6,470,241	B2		10/2002	Yoshikawa
6,472,771	B1		10/2002	Frese et al.
6,493,650	B1		12/2002	Rodgers
6,505,106	B1		1/2003	Lawrence
6,507,838	B1		1/2003	Syeda-Mahmood
6,516,256	B1		2/2003	Hartmann
6,518,881	B2		2/2003	Monroe
6,525,672	B2		2/2003	Chainer
6,529,159	B1		3/2003	Fan
6,535,804	B1		3/2003	Chun
6,552,682	B1		4/2003	Fan
6,556,905	B1		4/2003	Mittelsteadt et al.
6,559,769	B2		5/2003	Anthony
6,575,902	B1		6/2003	Burton
6,580,983	B2		6/2003	Laguer-Diaz
6,594,576	B2		7/2003	Fan
6,611,740	B2		8/2003	Lowrey et al.
6,611,755	B1		8/2003	Coffee
6,624,611	B2		9/2003	Kirmuss
6,629,029	B1		9/2003	Giles
6,629,030	B2		9/2003	Klausner
6,636,791	B2		10/2003	Okada
6,664,922	B1		12/2003	Fan
6,679,702	B1		1/2004	Rau
6,684,137	B2		1/2004	Takagi et al.
6,694,483	B1		2/2004	Nagata
6,701,234	B1		3/2004	Vogelsang
6,714,894	B1		3/2004	Tobey
6,718,239	B2		4/2004	Rayner
6,721,640	B2		4/2004	Glenn

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,728,612	B1	4/2004	Carver et al.	
6,732,031	B1	5/2004	Lightner et al.	
6,732,032	B1	5/2004	Banet et al.	
6,735,503	B2	5/2004	Ames	
6,737,954	B2	5/2004	Chainer et al.	
6,738,697	B2	5/2004	Breed	
6,739,078	B2	5/2004	Morley et al.	
6,741,168	B2 *	5/2004	Webb et al.	340/436
6,745,153	B2	6/2004	White	
6,747,692	B2	6/2004	Patel	
6,748,305	B1	6/2004	Klausner	
6,760,757	B1	7/2004	Lundberg et al.	
6,762,513	B2	7/2004	Landgraf	
6,795,017	B1	9/2004	Puranik	
6,795,111	B1	9/2004	Mazzilli	
6,795,759	B2	9/2004	Doyle	
6,798,743	B1	9/2004	Ma	
6,804,590	B2	10/2004	Sato	
6,810,362	B2	10/2004	Adachi et al.	
6,812,831	B2	11/2004	Ikeda	
6,819,989	B2	11/2004	Maeda et al.	
6,831,556	B1	12/2004	Boykin	
6,832,140	B2	12/2004	Fan	
6,832,141	B2	12/2004	Skeen et al.	
6,836,712	B2	12/2004	Nishina	
6,842,762	B2	1/2005	Raithel et al.	
6,847,873	B1	1/2005	Li	
6,850,823	B2	2/2005	Eun et al.	
6,859,695	B2	2/2005	Klausner	
6,862,524	B1	3/2005	Nagda	
6,865,457	B1	3/2005	Mittelsteadt et al.	
6,867,733	B2	3/2005	Sandhu	
6,873,261	B2	3/2005	Anthony	
6,882,313	B1	4/2005	Fan	
6,894,606	B2	5/2005	Forbes	
6,895,248	B1	5/2005	Akyol	
6,898,492	B2	5/2005	de Leon et al.	
6,898,493	B2	5/2005	Ehrman	
6,919,823	B1	7/2005	Lock	
6,922,566	B2	7/2005	Puranik	
6,928,348	B1	8/2005	Lightner et al.	
6,931,309	B2	8/2005	Phelan	
6,947,817	B2	9/2005	Diem	
6,950,122	B1	9/2005	Mirabile	
6,954,223	B2	10/2005	Miyazawa	
6,988,034	B1	1/2006	Marlatt	
7,012,632	B2	3/2006	Freeman	
7,020,548	B2	3/2006	Saito	
7,023,333	B2	4/2006	Blanco	
7,039,510	B2	5/2006	Gumpinger	
7,076,348	B2	7/2006	Bucher	
7,079,927	B1	7/2006	Tano	
7,082,359	B2	7/2006	Breed	
7,082,382	B1	7/2006	Rose et al.	
7,088,387	B1	8/2006	Freeman	
7,095,782	B1 *	8/2006	Cohen et al.	375/240.01
7,098,812	B2	8/2006	Hirota	
7,100,190	B2	8/2006	Johnson	
7,113,853	B2	9/2006	Hecklinger	
7,117,075	B1	10/2006	Larschan	
7,119,832	B2	10/2006	Blanco	
7,155,321	B2	12/2006	Bromley	
7,177,738	B2	2/2007	Diaz	
7,209,833	B2	4/2007	Isaji	
7,239,252	B2	7/2007	Kato	
7,265,663	B2	9/2007	Steele	
7,272,179	B2 *	9/2007	Siemens et al.	375/240.01
7,308,341	B2	12/2007	Schofield	
7,317,974	B2	1/2008	Luskin	
7,348,895	B2	3/2008	Lagassey	
7,349,027	B2	3/2008	Endo	
7,370,261	B2	5/2008	Winarski	
7,382,933	B2	6/2008	Dorai	
7,386,376	B2	6/2008	Basir	
7,389,178	B2	6/2008	Raz	
7,457,693	B2	11/2008	Olsen	
7,471,189	B2	12/2008	Vastad	
7,536,457	B2	5/2009	Miller	
7,561,054	B2	7/2009	Raz	
7,623,754	B1	11/2009	McKain	
7,659,827	B2	2/2010	Gunderson	
7,667,731	B2 *	2/2010	Kreiner et al.	348/143
7,702,442	B2	4/2010	Takenaka	
7,725,216	B2	5/2010	Kim	
7,768,548	B2 *	8/2010	Silvernail et al.	348/148
7,804,426	B2	9/2010	Etcheson	
7,821,421	B2	10/2010	Tamir	
7,853,376	B2	12/2010	Peng	
7,940,250	B2	5/2011	Forstall	
7,974,748	B2	7/2011	Goerick	
8,068,979	B2	11/2011	Breed	
8,113,844	B2	2/2012	Huang	
8,140,358	B1	3/2012	Ling	
8,239,092	B2	8/2012	Plante	
8,311,858	B2	11/2012	Everett	
8,314,708	B2	11/2012	Gunderson	
8,321,066	B2	11/2012	Becker	
8,417,562	B1	4/2013	Siemens	
8,508,353	B2	8/2013	Cook	
8,538,696	B1	9/2013	Cassanova	
8,564,426	B2	10/2013	Cook	
8,564,446	B2	10/2013	Gunderson	
8,571,755	B2	10/2013	Plante	
8,606,492	B1	12/2013	Botnen	
8,635,557	B2	1/2014	Geise	
8,676,428	B2	3/2014	Richardson	
8,744,642	B2	6/2014	Nemat-Nasser	
8,775,067	B2	7/2014	Cho	
8,803,695	B2	8/2014	Denson	
8,849,501	B2	9/2014	Cook et al.	
8,855,847	B2	10/2014	Uehara	
8,868,288	B2	10/2014	Plante	
8,880,279	B2	11/2014	Plante	
8,892,310	B1	11/2014	Palmer	
8,989,959	B2	3/2015	Plante	
8,996,240	B2	3/2015	Plante	
2001/0005217	A1	6/2001	Hamilton	
2001/0005804	A1	6/2001	Rayner	
2001/0018628	A1	8/2001	Jenkins	
2001/0020204	A1	9/2001	Runyon	
2001/0052730	A1	12/2001	Baur	
2002/0019689	A1	2/2002	Harrison	
2002/0027502	A1	3/2002	Mayor	
2002/0029109	A1	3/2002	Wong	
2002/0035422	A1	3/2002	Sasaki	
2002/0044225	A1	4/2002	Rakib	
2002/0059453	A1	5/2002	Eriksson	
2002/0061758	A1	5/2002	Zarlengo	
2002/0067076	A1	6/2002	Talbot	
2002/0087240	A1	7/2002	Raithel	
2002/0091473	A1	7/2002	Gardner	
2002/0105438	A1	8/2002	Forbes	
2002/0107619	A1	8/2002	Klausner	
2002/0111725	A1	8/2002	Burge	
2002/0111756	A1	8/2002	Modgil	
2002/0118206	A1	8/2002	Knittel	
2002/0120374	A1	8/2002	Douros	
2002/0135679	A1	9/2002	Scaman	
2002/0138587	A1	9/2002	Koehler	
2002/0163532	A1	11/2002	Thomas	
2002/0169529	A1	11/2002	Kim	
2002/0169530	A1	11/2002	Laguer-Diaz	
2002/0183905	A1	12/2002	Maeda	
2003/0016753	A1	1/2003	Kim	
2003/0028298	A1 *	2/2003	Macky et al.	701/35
2003/0053433	A1	3/2003	Chun	
2003/0055557	A1	3/2003	Dutta	
2003/0065805	A1	4/2003	Barnes	
2003/0067541	A1	4/2003	Joao	
2003/0079041	A1	4/2003	Parrella	
2003/0080713	A1	5/2003	Kirmuss	
2003/0080878	A1 *	5/2003	Kirmuss	340/936
2003/0081121	A1	5/2003	Kirmuss	
2003/0081122	A1	5/2003	Kirmuss	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2003/0081127	A1	5/2003	Kirmuss	
2003/0081128	A1	5/2003	Kirmuss	
2003/0081934	A1	5/2003	Kirmuss	
2003/0081935	A1	5/2003	Kirmuss	
2003/0095688	A1*	5/2003	Kirmuss	382/105
2003/0112133	A1	6/2003	Webb	
2003/0125854	A1	7/2003	Kawasaki	
2003/0144775	A1	7/2003	Klausner	
2003/0154009	A1*	8/2003	Basir et al.	701/35
2003/0158638	A1	8/2003	Yakes	
2003/0177187	A1	9/2003	Levine	
2003/0187704	A1	10/2003	Hashiguchi	
2003/0191568	A1	10/2003	Breed	
2003/0195678	A1	10/2003	Betters et al.	
2003/0214585	A1	11/2003	Bakewell	
2003/0220835	A1	11/2003	Barnes	
2003/0222880	A1	12/2003	Waterman	
2004/0008255	A1	1/2004	Lewellen	
2004/0033058	A1*	2/2004	Reich	386/111
2004/0039503	A1	2/2004	Doyle	
2004/0039504	A1	2/2004	Coffee	
2004/0044452	A1	3/2004	Bauer	
2004/0044592	A1	3/2004	Ubik	
2004/0054444	A1	3/2004	Abeska	
2004/0054513	A1	3/2004	Laird	
2004/0054689	A1	3/2004	Salmonsen	
2004/0064245	A1	4/2004	Knockeart	
2004/0070926	A1	4/2004	Boykin	
2004/0083041	A1	4/2004	Skeen	
2004/0088090	A1	5/2004	Wee	
2004/0103008	A1	5/2004	Wahlbin	
2004/0103010	A1	5/2004	Wahlbin	
2004/0104842	A1	6/2004	Drury	
2004/0111189	A1	6/2004	Miyazawa	
2004/0138794	A1	7/2004	Saito et al.	
2004/0145457	A1	7/2004	Schofield et al.	
2004/0153244	A1	8/2004	Kellum	
2004/0153362	A1	8/2004	Bauer	
2004/0167689	A1	8/2004	Bromley	
2004/0179600	A1	9/2004	Wells	
2004/0181326	A1	9/2004	Adams	
2004/0184548	A1	9/2004	Kerbiriou	
2004/0203903	A1	10/2004	Wilson	
2004/0209594	A1	10/2004	Naboulsi	
2004/0210353	A1	10/2004	Rice	
2004/0230345	A1	11/2004	Tzamaloukas	
2004/0230370	A1	11/2004	Tzamaloukas	
2004/0230373	A1	11/2004	Tzamaloukas	
2004/0230374	A1	11/2004	Tzamaloukas	
2004/0233284	A1	11/2004	Lesesky	
2004/0236474	A1	11/2004	Chowdhary	
2004/0243285	A1	12/2004	Gounder	
2004/0243308	A1	12/2004	Irish	
2004/0243668	A1	12/2004	Harjanto	
2004/0254689	A1	12/2004	Blazic	
2004/0254698	A1	12/2004	Hubbard et al.	
2005/0021199	A1	1/2005	Zimmerman	
2005/0043869	A1	2/2005	Funkhouser	
2005/0060070	A1	3/2005	Kapolka	
2005/0060071	A1	3/2005	Winner	
2005/0065716	A1	3/2005	Timko	
2005/0073585	A1	4/2005	Ettinger	
2005/0078423	A1	4/2005	Kim	
2005/0088291	A1	4/2005	Blanco	
2005/0099498	A1	5/2005	Lao	
2005/0100329	A1	5/2005	Lao	
2005/0102074	A1	5/2005	Kolls	
2005/0125117	A1	6/2005	Breed	
2005/0131585	A1	6/2005	Luskin	
2005/0131595	A1	6/2005	Luskin	
2005/0131597	A1	6/2005	Raz	
2005/0136949	A1	6/2005	Barnes	
2005/0137757	A1	6/2005	Phelan	
2005/0137796	A1	6/2005	Gumpinger	
2005/0146458	A1	7/2005	Carmichael	
2005/0149238	A1	7/2005	Stefani	
2005/0149259	A1	7/2005	Cherveny	
2005/0159964	A1	7/2005	Sonnenrein	
2005/0166258	A1	7/2005	Vasilevsky	
2005/0171692	A1	8/2005	Hamblen	
2005/0174217	A1	8/2005	Basir	
2005/0182538	A1	8/2005	Phelan	
2005/0182824	A1	8/2005	Cotte	
2005/0185052	A1	8/2005	Raisinghani	
2005/0185936	A9	8/2005	Lao	
2005/0192749	A1	9/2005	Flann	
2005/0197748	A1	9/2005	Hoist	
2005/0200714	A1	9/2005	Marchese	
2005/0203683	A1	9/2005	Olsen	
2005/0206741	A1	9/2005	Raber	
2005/0212920	A1	9/2005	Evans	
2005/0216144	A1	9/2005	Baldassa	
2005/0228560	A1	10/2005	Doherty	
2005/0233805	A1	10/2005	Okajima	
2005/0251304	A1	11/2005	Cancellara	
2005/0258942	A1	11/2005	Manasseh	
2005/0264691	A1	12/2005	Endo	
2005/0283284	A1	12/2005	Grenier	
2006/0001671	A1	1/2006	Kamijo	
2006/0007151	A1	1/2006	Ram	
2006/0011399	A1	1/2006	Brockway	
2006/0015233	A1	1/2006	Olsen	
2006/0022842	A1	2/2006	Zoladek	
2006/0025897	A1	2/2006	Shostak	
2006/0030986	A1	2/2006	Peng	
2006/0040239	A1	2/2006	Cummins	
2006/0047380	A1	3/2006	Welch	
2006/0053038	A1	3/2006	Warren	
2006/0055521	A1	3/2006	Blanco	
2006/0057543	A1	3/2006	Roald	
2006/0058950	A1	3/2006	Kato	
2006/0072792	A1	4/2006	Toda	
2006/0078853	A1	4/2006	Lanktree	
2006/0092043	A1	5/2006	Lagassey	
2006/0095175	A1*	5/2006	deWaal et al.	701/33
2006/0095199	A1	5/2006	Lagassey	
2006/0095349	A1	5/2006	Morgan	
2006/0103127	A1	5/2006	Lie	
2006/0106514	A1	5/2006	Liebl	
2006/0111817	A1	5/2006	Phelan	
2006/0122749	A1	6/2006	Phelan	
2006/0142913	A1	6/2006	Coffee	
2006/0147187	A1	7/2006	Takemoto	
2006/0161960	A1	7/2006	Benoit	
2006/0168271	A1	7/2006	Pabari	
2006/0178793	A1	8/2006	Hecklinger	
2006/0192658	A1	8/2006	Yamamura	
2006/0200008	A1	9/2006	Moore-Ede	
2006/0209090	A1	9/2006	Kelly et al.	
2006/0209840	A1	9/2006	Paatela	
2006/0212195	A1	9/2006	Veith	
2006/0226344	A1	10/2006	Werth	
2006/0229780	A1	10/2006	Underdahl	
2006/0242680	A1	10/2006	Johnson	
2006/0247833	A1*	11/2006	Malhotra et al.	701/33
2006/0253307	A1	11/2006	Warren	
2006/0259218	A1	11/2006	Wu	
2006/0261931	A1	11/2006	Cheng	
2007/0001831	A1	1/2007	Raz	
2007/0005404	A1	1/2007	Raz	
2007/0027583	A1	2/2007	Tamir	
2007/0027726	A1	2/2007	Warren	
2007/0035632	A1	2/2007	Silvernail	
2007/0043487	A1	2/2007	Krzystofczyk	
2007/0120948	A1	5/2007	Fujioka	
2007/0124332	A1	5/2007	Ballesty	
2007/0127833	A1	6/2007	Singh	
2007/0132773	A1	6/2007	Plante	
2007/0135979	A1	6/2007	Plante	
2007/0135980	A1	6/2007	Plante	
2007/0136078	A1	6/2007	Plante	
2007/0142986	A1	6/2007	Alaous	
2007/0143499	A1	6/2007	Chang	
2007/0150138	A1	6/2007	Plante	

(56) **References Cited**

U.S. PATENT DOCUMENTS

2007/0150140	A1	6/2007	Seymour	
2007/0173994	A1	7/2007	Kubo	
2007/0179691	A1	8/2007	Grenn	
2007/0183635	A1	8/2007	Weidhaas	
2007/0208494	A1	9/2007	Chapman	
2007/0216521	A1	9/2007	Guensler	
2007/0219685	A1	9/2007	Plante	
2007/0219686	A1	9/2007	Plante	
2007/0241874	A1	10/2007	Okpysh	
2007/0244614	A1	10/2007	Nathanson	
2007/0257781	A1	11/2007	Denson	
2007/0257782	A1	11/2007	Etcheson	
2007/0257804	A1	11/2007	Gunderson	
2007/0257815	A1	11/2007	Gunderson	
2007/0260677	A1	11/2007	DeMarco	
2007/0268158	A1	11/2007	Gunderson	
2007/0271105	A1	11/2007	Gunderson	
2007/0273480	A1	11/2007	Burkman	
2007/0279214	A1	12/2007	Buehler	
2007/0299612	A1	12/2007	Kimura	
2008/0035108	A1	2/2008	Ancimer et al.	
2008/0059019	A1	3/2008	Delia	
2008/0071827	A1	3/2008	Hengel	
2008/0111666	A1	5/2008	Plante	
2008/0122603	A1	5/2008	Plante	
2008/0143834	A1	6/2008	Comeau	
2008/0147267	A1	6/2008	Plante et al.	
2008/0157510	A1	7/2008	Breed	
2008/0167775	A1	7/2008	Kuttenberger	
2008/0169914	A1	7/2008	Albertson	
2008/0177436	A1	7/2008	Fortson	
2008/0211779	A1	9/2008	Pryor	
2008/0234920	A1	9/2008	Nurminen	
2008/0252412	A1	10/2008	Larsson	
2008/0252485	A1	10/2008	Lagassey	
2008/0269978	A1	10/2008	Shirole	
2008/0281485	A1	11/2008	Plante	
2008/0309762	A1	12/2008	Howard et al.	
2008/0319604	A1	12/2008	Follmer	
2009/0009321	A1	1/2009	McClellan	
2009/0043500	A1	2/2009	Satoh	
2009/0043971	A1	2/2009	Kim	
2009/0051510	A1	2/2009	Follmer	
2009/0138191	A1	5/2009	Engelhard	
2009/0157255	A1	6/2009	Plante	
2009/0216775	A1	8/2009	Ratliff et al.	
2009/0224869	A1	9/2009	Baker	
2009/0290848	A1	11/2009	Brown	
2009/0299622	A1	12/2009	Denaro	
2009/0312998	A1	12/2009	Berckmans	
2009/0326796	A1	12/2009	Prokhorov	
2010/0030423	A1	2/2010	Nathanson	
2010/0045451	A1	2/2010	Periwal	
2010/0057342	A1	3/2010	Muramatsu	
2010/0063672	A1	3/2010	Anderson	
2010/0063850	A1	3/2010	Daniel	
2010/0070175	A1	3/2010	Soulchin	
2010/0085193	A1	4/2010	Boss	
2010/0085430	A1	4/2010	Kreiner et al.	
2010/0087984	A1	4/2010	Joseph	
2010/0100315	A1	4/2010	Davidson	
2010/0153146	A1	6/2010	Angell	
2010/0157061	A1	6/2010	Katsman	
2010/0191411	A1	7/2010	Cook	
2010/0220892	A1	9/2010	Kawakubo	
2010/0250021	A1	9/2010	Cook	
2010/0250060	A1	9/2010	Maeda	
2010/0268415	A1	10/2010	Ishikawa	
2010/0312464	A1	12/2010	Fitzgerald	
2011/0035139	A1	2/2011	Konlditslotis	
2011/0043624	A1	2/2011	Haug	
2011/0060496	A1	3/2011	Nielsen	
2011/0077028	A1	3/2011	Wilkes	
2011/0091079	A1	4/2011	Yu-Song	
2011/0093159	A1	4/2011	Boling	
2011/0112995	A1	5/2011	Chang	
2011/0121960	A1	5/2011	Tsai	
2011/0125365	A1	5/2011	Larschan	
2011/0130916	A1	6/2011	Mayer	
2011/0161116	A1	6/2011	Peak	
2011/0173015	A1	7/2011	Chapman	
2011/0213628	A1	9/2011	Peak	
2011/0224891	A1	9/2011	Iwuchukwu	
2011/0251752	A1	10/2011	DeLarocheliere	
2011/0254676	A1	10/2011	Marumoto	
2011/0273568	A1*	11/2011	Lagassey	348/159
2011/0283223	A1	11/2011	Vattinen et al.	
2011/0304446	A1	12/2011	Basson	
2012/0021386	A1	1/2012	Anderson	
2012/0035788	A1	2/2012	Trepagnier	
2012/0041675	A1	2/2012	Juliver	
2012/0046803	A1	2/2012	Inou	
2012/0071140	A1	3/2012	Oesterling	
2012/0078063	A1	3/2012	Moore-Ede	
2012/0100509	A1	4/2012	Gunderson	
2012/0109447	A1	5/2012	Yousefi	
2012/0150436	A1	6/2012	Rossano	
2012/0190001	A1	7/2012	Knight	
2012/0210252	A1	8/2012	Fedoseyeva	
2012/0277950	A1	11/2012	Plante	
2013/0004138	A1	1/2013	Kilar	
2013/0006469	A1	1/2013	Green	
2013/0021148	A1	1/2013	Cook	
2013/0030660	A1	1/2013	Fujimoto	
2013/0073114	A1	3/2013	Nemat-Nasser	
2013/0096731	A1	4/2013	Tamari	
2013/0197774	A1	8/2013	Denson	
2013/0274950	A1	10/2013	Richardson	
2013/0317711	A1	11/2013	Plante	
2013/0332004	A1	12/2013	Gompert et al.	
2013/0345927	A1	12/2013	Cook	
2014/0025254	A1	1/2014	Plante	
2014/0046550	A1	2/2014	Palmer	
2014/0047371	A1	2/2014	Palmer	
2014/0098228	A1	4/2014	Plante	
2014/0152828	A1	6/2014	Plante	
2014/0226010	A1	8/2014	Molin	
2014/0279707	A1	9/2014	Joshua	
2014/0280204	A1	9/2014	Avery	
2014/0335902	A1	11/2014	Guba	
2015/0035665	A1	2/2015	Plante	
2015/0057836	A1	2/2015	Plante	
2015/0105934	A1	4/2015	Palmer	
2015/0134226	A1	5/2015	Palmer	

FOREIGN PATENT DOCUMENTS

CA	2692415	A1	8/2011
DE	4416991	A1	11/1995
DE	20311262		9/2003
DE	202005008238		9/2005
DE	102004004669	A1	12/2005
EP	0708427	A2	4/1996
EP	0840270	A2	5/1998
EP	0848270	A2	5/1998
EP	1170697	A2	1/2002
EP	1324274	A2	7/2003
EP	1355278	A1	10/2003
EP	1427165	A2	6/2004
EP	1818873	A1	8/2007
GB	2268608	A	1/1994
GB	2402530	A	12/2004
GB	2451485		2/2009
GB	2447184	B	6/2011
GB	2446994		8/2011
JP	58085110		5/1983
JP	S5885110	A	5/1983
JP	62091092		4/1987
JP	S6291092	A	4/1987
JP	S62166135	A	7/1987
JP	02056197		2/1990
JP	H0256197	A	2/1990
JP	H04257189	A	9/1992
JP	H05137144	A	6/1993

(56) **References Cited**

FOREIGN PATENT DOCUMENTS

JP	5294188		11/1993
JP	H08124069	A	5/1996
JP	H09163357	A	6/1997
JP	H09272399	A	10/1997
JP	10076880		3/1998
JP	H1076880	A	3/1998
JP	2002191017	A	7/2002
WO	8809023	A1	11/1988
WO	9005076		5/1990
WO	9427844		12/1994
WO	9600957	A1	1/1996
WO	9701246		1/1997
WO	9726750	A1	7/1997
WO	9937503		7/1999
WO	9940545	A1	8/1999
WO	9962741		12/1999
WO	0007150	A1	2/2000
WO	0028410	A1	5/2000
WO	0048033		8/2000
WO	0077620		12/2000
WO	0123214		4/2001
WO	0125054		4/2001
WO	0146710	A2	6/2001
WO	03045514		6/2003
WO	2006022824	A2	3/2006
WO	2007067767		6/2007
WO	2011055743	A1	5/2011

OTHER PUBLICATIONS

Adaptec published and sold its VideoOh! DVD software USB 2.0 Edition in at least Jan. 24, 2003.

Ambulance Companies Use Video Technology to Improve Driving Behavior, Ambulance Industry Journal, Spring 2003.

Amended Complaint for Patent Infringement, Trade Secret Misappropriation, Unfair Competition and Conversion in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997-H-RBB, for the Southern District of California, Document 34, filed Oct. 20, 2011, pp. 1-15.

Amendment filed Dec. 23, 2009 during prosecution of U.S. Appl. No. 11/566,424.

Answer to Amended Complaint; Counterclaims; and Demand for Jury Trial in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997 H (RBB), for the Southern District of California, Document 47, filed Dec. 13, 2011, pp. 1-15.

U.S. Appl. No. 11/296,906, filed Dec. 8, 2005, File History.

U.S. Appl. No. 11/297,669, filed Dec. 8, 2005, File History.

U.S. Appl. No. 11/297,889, filed Dec. 8, 2005, File History.

U.S. Appl. No. 11/298,069, filed Dec. 9, 2005, File History.

U.S. Appl. No. 11/299,028, filed Dec. 9, 2005, File History.

U.S. Appl. No. 11/593,659, filed Nov. 7, 2006, File History.

U.S. Appl. No. 11/593,682, filed Nov. 7, 2006, File History.

U.S. Appl. No. 11/593,882, filed Nov. 7, 2006, File History.

U.S. Appl. No. 11/595,015, filed Nov. 9, 2006, File History.

U.S. Appl. No. 11/637,754, filed Dec. 13, 2006, File History.

U.S. Appl. No. 11/637,755, filed Dec. 13, 2006, File History.

Bill, 'DriveCam—FAQ', Dec. 12, 2003.

Bill Siuru, 'DriveCam Could Save You Big Bucks', Land Line Magazine, May-Jun. 2000.

Chris Woodyard, 'Shuttles save with DriveCam', Dec. 9, 2003.

Dan Carr, Flash Video Template: Video Presentation with Navigation, Jan. 16, 2006, http://www.adobe.com/devnet/fiash/articles/vidtemplate_mediapreso_flash8.html.

David Cullen, 'Getting a real eyeful', Fleet Owner Magazine, Feb. 2002.

David Maher, 'DriveCam Brochure Folder', Jun. 6, 2005.

David Maher, "DriveCam Brochure Folder", Jun. 8, 2005.

David Vogeleer et al., Macromedia Flash Professional 8UNLEASHED (Sams Oct. 12, 2005).

Del Lisk, 'DriveCam Training Handout Ver4', Feb. 3, 2005.

Drivecam, Inc., User's Manual for Drivecam Video Systems' Hindsight 20/20 Software Version 4.0 (2003).

DriveCam, Inc.'s Infringement Contentions Exhibit A, U.S. Pat. No. 6,389,340, Document 34.1, Oct. 20, 2011.

DriveCam, Inc.'s Infringement Contentions Exhibit B, U.S. Pat. No. 7,804,426, Document 34.2, Oct. 20, 2011.

DriveCam, Inc.'s Infringement Contentions Exhibit C, U.S. Pat. No. 7,659,827, Document 34.3, Oct. 20, 2011.

DriveCam, Inc.'s Infringement Contentions Exhibit D, Document 34.4, Oct. 20, 2011.

DriveCam—Illuminator Data Sheet, Oct. 2, 2004.

Drivecam.com as retrieved by the Internet Wayback Machine as of Mar. 5, 2005.

DriveCam Driving Feedback System, Mar. 15, 2004.

Driver Feedback System, Jun. 12, 2001.

First Amended Answer to Amended Complaint and First Amended Counterclaims; and Demand for Jury Trial in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997 H (RBB), for the Southern District of California, Document 53, filed Dec. 20, 2011, pp. 1-48.

First Amended Answer to Amended Complaint and First Amended Counterclaims; and Demand for Jury Trial in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997 H (RBB), for the Southern District of California, Document 55, filed Jan. 1, 2012, pp. 86-103.

First Amended Answer to Amended Complaint and First Amended Counterclaims; and Demand for Jury Trial in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997 H (RBB), for the Southern District of California, Document 55, filed Jan. 3, 2012, pp. 86-103.

First Amended Answer to Amended Complaint and First Amended Counterclaims; and Demand for Jury Trial in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11 -CV-00997 H (RBB), for the Southern District of California, Exhibit A, Document 55, filed Jan. 3, 2012, pp. 49-103.

Franke, U., et al., Autonomous Driving Goes Downtown, IEEE Intelligent Systems, 13(6):40-48 (1988); Digital Object Identifier 10.1109/5254.736001.

Gallagher, B., et al., Wireless Communications for Vehicle Safety: Radio Link Performance and Wireless Connectivity Methods, Vehicular Technology Magazine, IEEE, 1(4):4- 24 (2006); Digital Object Identifier 10.1109/MVT.2006.343641.

Gandhi, T., et al., Pedestrian Protection Systems: Issues, Survey, and Challenges, IEEE Transactions on Intelligent Transportation Systems, 8(3):413-430 (2007); Digital Object Identifier 10.1109/TITS.2007.903444.

Gary and Sophia Rayner, Final Report for Innovations Deserving Exploratory Analysis (IDEA) Intelligent Transportation Systems (ITS) Programs' Project 84, I-Witness Black Box Recorder, San Diego, CA. Nov. 2001.

GE published its VCR User's Guide for Model VG4255 in 1995.

Glenn Oster, 'Hindsight 20/20 v4.0 Software Installation', 1 of 2, Jun. 20, 2003.

Glenn Oster, 'HindSight 20/20 v4.0 Software Installation', 2 of 2, Jun. 20, 2003.

Glenn Oster, 'Illuminator Installation', Oct. 3, 2004.

Hans Fantel, Video; Search Methods Make a Difference in Picking VCR's, NY Times, Aug. 13, 1989.

I/O Port Racing Supplies' website discloses using Traqmate's Data Acquisition with Video Overlay system in conjunction with professional driver coaching sessions (available at http://www.ioportracing.com/Merchant2/merchant.mvc?Screen=CTGY&Categorys-ub.-Code=coaching)., printed from site on Jan. 11, 2012.

Interior Camera Data Sheet', Oct. 26, 2001.

International Search Report and Written Opinion issued in PCT/US07/68325 on Feb. 27, 2008.

International Search Report and Written Opinion issued in PCT/US07/68328 on Oct. 15, 2007.

International Search Report and Written Opinion issued in PCT/US07/68329 on Mar. 3, 2008.

International Search Report and Written Opinion issued in PCT/US07/68332 on Mar. 3, 2008.

(56) **References Cited**

OTHER PUBLICATIONS

International Search Report and Written Opinion issued in PCT/US07/68334 on Mar. 5, 2008.
International Search Report for PCT/US2006/47055, Mailed Mar. 20, 2008 (2 pages).
International Search Report issued in PCT/US2006/47042 mailed Feb. 25, 2008.
J. Gallagher, 'Lancer Recommends Tech Tool', Insurance and Technology Magazine, Feb. 2002.
Jean (DriveCam vendor), 'DC Data Sheet', Nov. 6, 2002.
Jean (DriveCam vendor), 'DriveCam brochure', Nov. 6, 2002.
Jean (DriveCam vendor), 'Feedback Data Sheet', Nov. 6, 2002.
Jean (DriveCam vendor), 'Hindsight 20-20 Data Sheet', Nov. 4, 2002.
Jessyca Wallace, 'Analyzing and Processing DriveCam Recorded Events', Oct. 6, 2003.
Jessyca Wallace, 'Overview of the DriveCam Program', Dec. 15, 2005.
Jessyca Wallace, 'The DriveCam Driver Feedback System', Apr. 6, 2004.
Joint Claim Construction Chart, U.S. Pat. No. 6,389,340, 'Vehicle Data Recorder' for Case No. 3:11-CV-00997-H-RBB, Document 43-1, filed Dec. 1, 2011, pp. 1-33.
Joint Claim Construction Chart in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 11-CV-0997-H (RBB), for the Southern District of California, Document 43, filed Dec. 1, 2011, pp. 1-2.
Joint Claim Construction Worksheet, U.S. Pat. No. 6,389,340, 'Vehicle Data Reporter' for Case No. 3:11-CV-00997-H-RBB, Document 44-1, filed Dec. 1, 2011, pp. 1-10.
Joint Claim Construction Worksheet, U.S. Pat. No. 6,389,340, "Vehicle Data Reporter" for Case No. 3:11-CV-00997-H-RBB, Document 44-1, filed Dec. 1, 2011, pp. 1-10.
Joint Claim Construction Worksheet in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997 H (RBB), for the Southern District of California, Document 44, filed Dec. 1, 2011, pp. 1-2.
Joint Motion for Leave to Supplement Disclosure of Asserted Claims and Preliminary Infringement Contentions in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-cv-00997-H-RBB, Document 29, filed Oct. 12, 2011, pp. 1-7.
Julie Stevens, 'DriveCam Services', Nov. 15, 2004.
Julie Stevens, 'Program Support Roll-Out & Monitoring', Jul. 13, 2004.
Jung, Sang-Hack, et al., Egomotion Estimation in Monocular Infrared Image Sequence for Night Vision Applications, IEEE Workshop on Applications of Computer Vision (WACV '07), Feb. 2007, pp. 8-8; Digital Object Identifier 10.1109/WACV.2007.20.
JVC Company of America, JVC Video Cassette Recorder HR-IP820U Instructions (1996).
Kamijo, S., et al., A Real-Time Traffic Monitoring System by Stochastic Model Combination, IEEE International Conference on Systems, Man and Cybernetics, 4:3275-3281 (2003).
Kamijo, S., et al., An Incident Detection System Based on Semantic Hierarchy, Proceedings of the 7th International IEEE Intelligent Transportation Systems Conference, 2004, Oct. 3-6, pp. 853-858; Digital Object Identifier 10.1109/ITSC.2004.1399015.
Karen, 'Downloading Options to HindSight 20120', Aug. 6, 2002.
Karen, 'Managers Guide to the DriveCam Driving Feedback System', Jul. 30, 2002.
Kathy Latus (Latus Design), 'Case Study—Cloud 9 Shuttle', Sep. 23, 2005.
Kathy Latus (Latus Design), 'Case Study—Lloyd Pest Control', Jul. 19, 2005.
Kathy Latus (Latus Design), 'Case Study—Time Warner Cable', Sep. 23, 2005.
Ki, Yong-Kul, et al., A Traffic Accident Detection Model using Metadata Registry, Proceedings of the Fourth International Conference on Software Engineering Research, Management and Applications; Aug. 9-11, 2006 pp. 255-259 Digital Object Identifier 10.1109/SERA.2006.8.
Kitchin, Charles. "Understanding accelerometer scale factor and offset adjustments." Analog Devices (1995).
Lin, Chin-Teng et al., EEG-based drowsiness estimation for safety driving using independent component analysis; IEEE Transactions on Circuits and Systems-I: Regular Papers, 52(12):2726-2738 (2005); Digital Object Identifier 10.1109/TCSI.2005.857555.
Lisa McKenna, 'A Fly on the Windshield?', Pest Control Technology Magazine, Apr. 2003.
Miller, D.P., Evaluation of Vision Systems for Teleoperated Land Vehicles. Control Systems Magazine, IEEE, 8(3):37-41 (1988); Digital Identifier 10.1109/37.475.
Munder, S., et al., Pedestrian Detection and Tracking Using a Mixture of View-Based Shape-Texture Models, IEEE Transactions on Intelligent Transportation Systems, 9(2):333-343 (2008); Digital Identifier 10.1109/TITS.2008.922943.
Panasonic Corporation, Video Cassette Recorder (VCR) Operating Instructions for Models No. PV-V4020/PV-V4520.
Passenger Transportation Mode Brochure, May 2, 2005.
Patent Abstracts of Japan vol. 007, No. 180 (P-215), Aug. 9, 1983 & JP 58 085110 A (Mitsuhisa Ichikawa), May 21, 1983.
Patent Abstracts of Japan vol. 011, No. 292 (E-543), Sep. 19, 1987 & JP 62 091092 A (Ok Eng:Kk), Apr. 25, 1987.
Patent Abstracts of Japan vol. 012, No. 001 (M-656), Jan. 6, 1988 & JP 62 166135 A (Fuji Electric Co Ltd), Jul. 22, 1987.
Patent Abstracts of Japan vol. 014, No. 222 (E-0926), May 10, 1990 & JP 02 056197 A (Sanyo Electric Co Ltd), Feb. 26, 1990.
Patent Abstracts of Japan vol. 017, No. 039 (E-1311), Jan. 25, 1993 & JP 04 257189 A (Sony Corp), Sep. 11, 1992.
Patent Abstracts of Japan vol. 017, No. 521 (E-1435), Sep. 20, 1993 & JP 05 137144 A (Kyocera Corp), Jun. 1, 1993.
Patent Abstracts of Japan vol. 1996, No. 09, Sep. 30, 1996 & JP 08 124069 A (Toyota Motor Corp), May 17, 1996.
Patent Abstracts of Japan vol. 1997, No. 10, Oct. 31, 1997 & JP 09 163357 A (Nippon Soken Inc), Jun. 20, 1997.
Patent Abstracts of Japan vol. 1998, No. 2, Jan. 30, 1998 & JP 09 272399 A (Nippon Soken Inc), Oct. 21, 1997.
Patent Abstracts of Japan vol. 1998, No. 8, Jun. 30, 1998 & JP 10 076880 A (Muakami Corp), Mar. 24, 1998.
PCT/US2010/022012, Invitation to Pay Additional Fees with Communication of Partial International Search, Jul. 21, 2010.
Peter G. Thurlow, Letter (including exhibits) Regarding Patent Owner's Response to Initial Office Action in Ex Parte Reexamination, Mar. 27, 2012.
Quinn Maughan, 'DriveCam Enterprise Services', Jan. 5, 2006.
Quinn Maughan, 'DriveCam Managed Services', Jan. 5, 2006.
Quinn Maughan, 'DriveCam Standard Edition', Jan. 5, 2006.
Quinn Maughan, 'DriveCam Unit Installation', Jul. 21, 2005.
Quinn Maughan, 'Enterprise Services', Apr. 17, 2006.
Quinn Maughan, 'Enterprise Services', Apr. 7, 2006.
Quinn Maughan, 'Hindsight Installation Guide', Sep. 29, 2005.
Quinn Maughan, 'Hindsight Users Guide', Jun. 7, 2005.
Ronnie Rittenberry, 'Eyes on the Road', Jul. 2004.
Supplement to DriveCam's Disclosure of Asserted Claims and Preliminary Infringement Contentions' in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997-H-RBB, for the Southern District of California. Oct. 14, 2011.
The DriveCam, Nov. 6, 2002.
The DriveCam, Nov. 8, 2002.
Traqmate GPS Data Acquisition's Traqmate Data Acquisition with Video Overlay system was used to create a video of a driving event on Oct. 2, 2005 (available at http://www.trackvision.net/phpBB2/viewtopic.php?t=51&sid=1184fbbcbe3be5c87ffa0f2ee6e2da76), printed from site on Jan. 11, 2012.
U.S. Appl. No. 12/691,639, entitled 'Driver Risk Assessment System and Method Employing Selectively Automatic Event Scoring', filed Jan. 21, 2010.
U.S. Appl. No. 11/377,167, Final Office Action dated Nov. 8, 2013.
U.S. Appl. No. 11/377,157, filed Mar. 16, 2006 entitled, "Vehicle Event Recorder Systems and Networks Having Parallel Communications Links".
U.S. Appl. No. 11/377,167, filed Mar. 16, 2006 entitled, "Vehicle Event Recorder Systems and Networks Having Integrated Cellular Wireless Communications Systems".

(56) **References Cited**

OTHER PUBLICATIONS

USPTO Final Office Action for U.S. Appl. No. 11/297,669, mailed Nov. 7, 2011, 15 pages.
USPTO Final Office Action for U.S. Appl. No. 13/957,810, mailed Jun. 27, 2014, 24 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/296,906, mailed Apr. 2, 2009, 7 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/296,906, mailed Nov. 6, 2009, 9 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/297,669, mailed Apr. 28, 2011, 11 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/299,028, mailed Apr. 24, 2008, 9 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,164, mailed Nov. 19, 2007, 7 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,164, mailed Nov. 25, 2011, 9 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,164, mailed Sep. 11, 2008, 8 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,167, mailed Jun. 5, 2008, 11 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/800,876, mailed Dec. 1, 2010, 12 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/800,876, mailed Dec. 20, 2011, 8 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 12/096,591, mailed May 20, 2014, 19 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/296,907, Mailed Mar. 22, 2007 (17 pages).
USPTO Non-final Office Action mailed Aug. 27, 2009 during prosecution of U.S. Appl. No. 11/566,424.
Veeraraghavan, H., et al., Computer Vision Algorithms for Intersection Monitoring, IEEE Transactions on Intelligent Transportation Systems, 4(2):78-89 (2003); Digital Object Identifier 10.1109/TITS.2003.821212.
Wijesoma, W.S., et al., Road Curb Tracking in an Urban Environment, Proceedings of the Sixth International Conference of Information Fusion, 1:261-268 (2003).
Written Opinion issued in PCT/US07/68328 on Oct. 15, 2007.
Written Opinion of the International Searching Authority for PCT/US2006/47042. Mailed Feb. 25. 2008 (5 pages).
Written Opinion of the International Searching Authority for PCT/US2006/47055, Mailed Mar. 20, 2008 (5 pages).
Inovate Motorsports, OT-1 16 Channel OBD-II Interface User Manual, Version 1.0, Nov. 28, 2007, pp. 3, 4, 21 & 27.
Trivinci Systems, LLC, Race-Keeper Systems User Guide, Jan. 2011, v1, 1.02, pp. 34 and 39.
USPTO Non-Final Office Action for U.S. Appl. No. 14/036,299, mailed Aug. 12, 2014.
USPTO Non-final Office Action for U.S. Appl. No. 13/957,810, mailed Nov. 27, 2013, 18 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 13/957,810, mailed Apr. 17, 2015, 6 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 12/096,591, mailed Mar. 27, 2013, 16 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 12/096,591, mailed Jun. 14, 2011, 8 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,167, mailed Jun. 27, 2013, 11 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,164, mailed Sep. 10, 2012, 10 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,164, mailed Aug. 18, 2014, 5 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/377,164, mailed Apr. 7, 2014, 7 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/296,906, mailed Jun. 12, 2012, 13 pages.
USPTO Non-Final Office Action for U.S. Appl. No. 11/296,906, mailed Apr. 8, 2014, 19 pages.
"DriveCam, Inc's Disclosure of Proposed Constructions and Extrinsic Evidence Pursuant to Patent L.R. 4.1.a & 4.1.b" Disclosure and Extrinsic Evidence in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997-H-RBB, for the Southern District of California. Nov. 8, 2011, 68 pages.
"DriveCam Driving Feedback System", DriveCam brochure, Jun. 12, 2001, Document #6600128, 2 pages.
"DriveCam Driving Feedback System" DriveCam brochure, Mar. 15, 2004, 4 pages.
"DriveCam Passenger Transportation Module", DriveCam brochure, Oct. 26, 2001, 2 pages.
"DriveCam Video Event Data Recorder", DriveCam brochure, Nov. 6, 2002, Document #6600127, 2 pages.
"Responsive Claim Construction and Identification of Extrinsic Evidence of Defendani/Counterclaimant SmartDrive Systems, Inc." Claim Construction and and Extrinsic Evidence in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997-H (RBB), for the Southern District of California. Nov. 15, 2011, 20 pages.
"Sonic MyDVD 4.0: Tutorial: Trimming video segments". Tutorial for software bundled with Adaptec VideoOh! DVD USB 2.0 Edition, 2003, 13 pages.
"User's Manual for DriveCam Video Systems' HindSight 20/20 Software Version 4.0" DriveCam Manual, San Diego, 2003, Document #6600141-1, 54 pages.
Canadian Office Action issued in Application No. 2,632,685 dated Jan. 30, 2015; 5 pages.
Dan Maher, "DriveCam Taking Risk Out of Driving", DriveCam brochure folder, Jun. 6, 2005, 6 pages.
Del Lisk, "DriveCam Training Seminar" Handout, 2004, 16 pages.
European Examination Report issued in EP 07772812.9 on Jan. 22, 2015; 5 pages.
Jean (DriveCam vendor) "DriveCam Driving Feedback System", DriveCam brochure, Nov. 6, 2002, Document #6600128-1, 2 pages.
Notice of Allowance Allowance for U.S. Appl. No. 14/036,299, mailed Mar. 20, 2015, 5 pages.
Notice of Allowance Application for U.S. Appl. No. 11/566,424, mailed Feb. 26, 2010, 6 pages.
Notice of Allowance for U.S. Appl. No. 11/377,164, mailed Dec. 3, 2014, 5 pages.
Notice of Allowance for U.S. Appl. No. 11/377,164, mailed Feb. 13, 2015, 2 pages.
Notice of Allowance for U.S. Appl. No. 11/377,164, mailed Feb. 25, 2014, 2 pages.
Notice of Allowance for U.S. Appl. No. 11/377,164, mailed Nov. 18, 2013, 7 pages.
Notice of Allowance for U.S. Appl. No. 11/377,167, mailed Apr. 1, 2015, 7 pages.
Notice of Allowance for U.S. Appl. No. 11/800,876, mailed Apr. 19, 2012, 8 pages.
USPTO Final Office Action for U.S. Appl. No. 11/296,906, mailed Aug. 8, 2012, 15 pages.
USPTO Final Office Action for U.S. Appl. No. 12/096,591, mailed Dec. 5, 2014, 23 pages.
USPTO Final Office Action for U.S. Appl. No. 12/096,591, mailed Jul. 18, 2012, 15 pages.
USPTO Final Office Action for U.S. Appl. No. 12/096,591, mailed Nov. 7, 2013, 14 pages.
USPTO Final Office Action for U.S. Appl. No. 13/957,810, mailed Jun. 27, 2014, 22 pages.
USPTO Final Office Action for U.S. Appl. No. 14/036,299, mailed Feb. 24, 2015, 9 pages.
Notice of Allowance for U.S. Appl. No. 13/957,810, mailed Jun. 8, 2015, 10 pages.
Preliminary Claim Construction and Identification of Extrinsic Evidence of Defendant/Counterclaimant SmartDriveSystems, Inc.' in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997-H (RBB), for the Southern District of California. Nov. 8, 2011. (13 pgs.).
DriveCam, Inc.'s Infringement Contentions Exhibit B, U.S. Pat. No. 7,659,827. Aug. 19, 2011. (29 pgs.).

(56) **References Cited**

OTHER PUBLICATIONS

DriveCam, Inc.'s Infringement Contentions Exhibit C, U.S. Pat. No. 7,804,426. Aug. 19, 2011. (47 pgs.).

DriveCam's Disclosure of Asserted Claims and Preliminary Infringement Contentions in *DriveCam, Inc.* v. *SmartDrive Systems, Inc.*, Case No. 3:11-CV-00997-H-RBB, for the Southern District of California. Aug. 19, 2011. (6 pgs.).

* cited by examiner

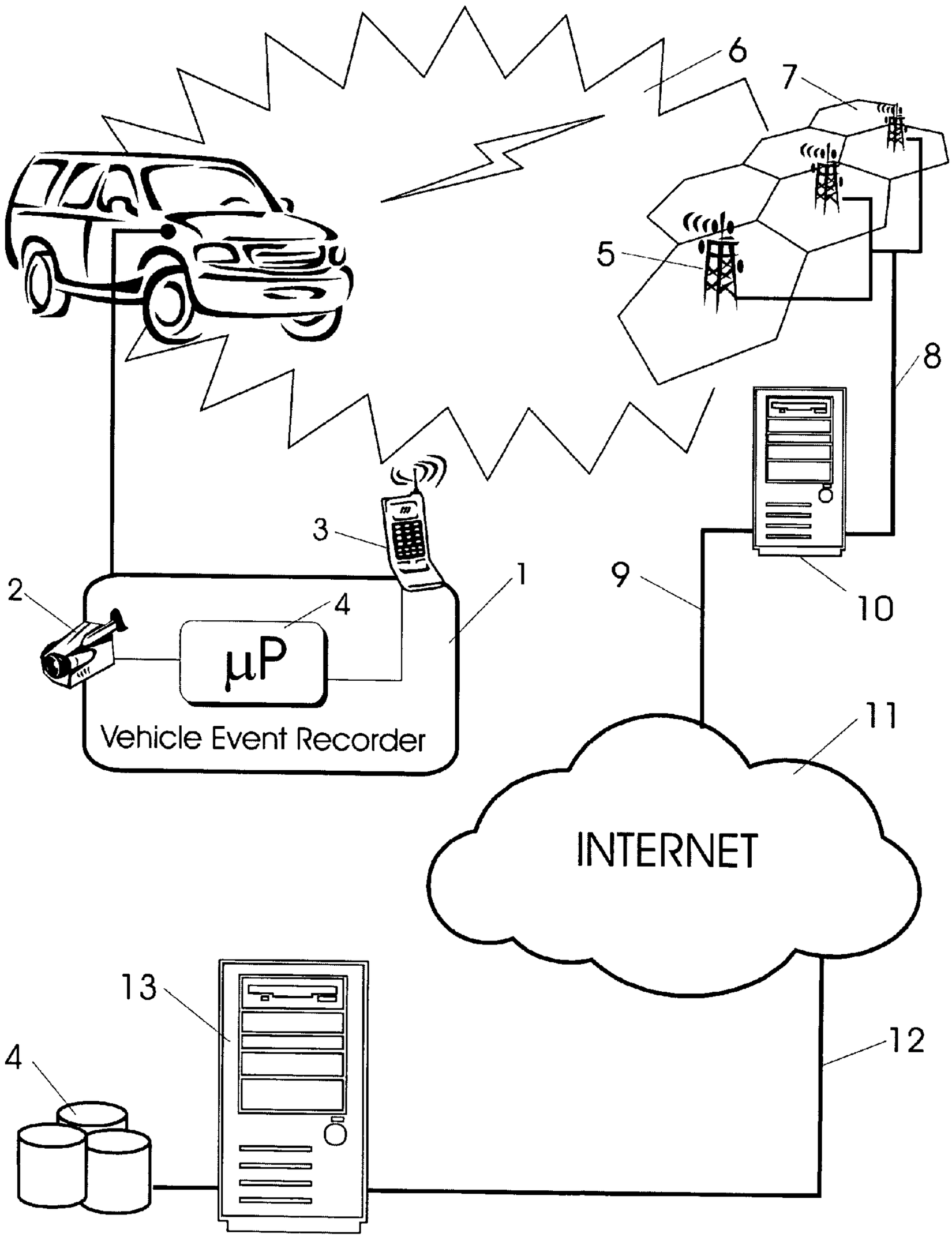


Fig. 1

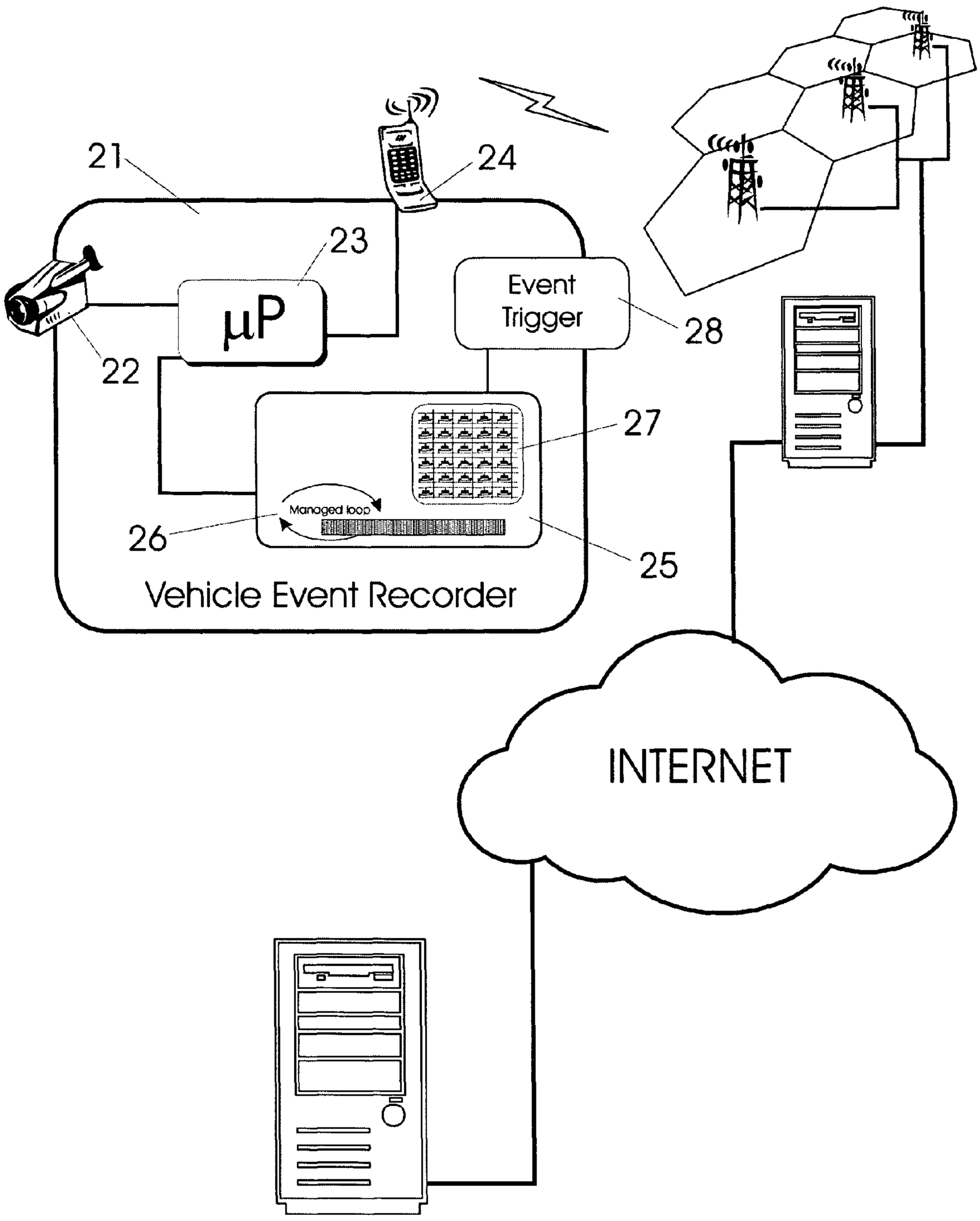

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μP
Event Trigger
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Managed loop
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Vehicle Event Recorder
INTERNET

Fig. 2

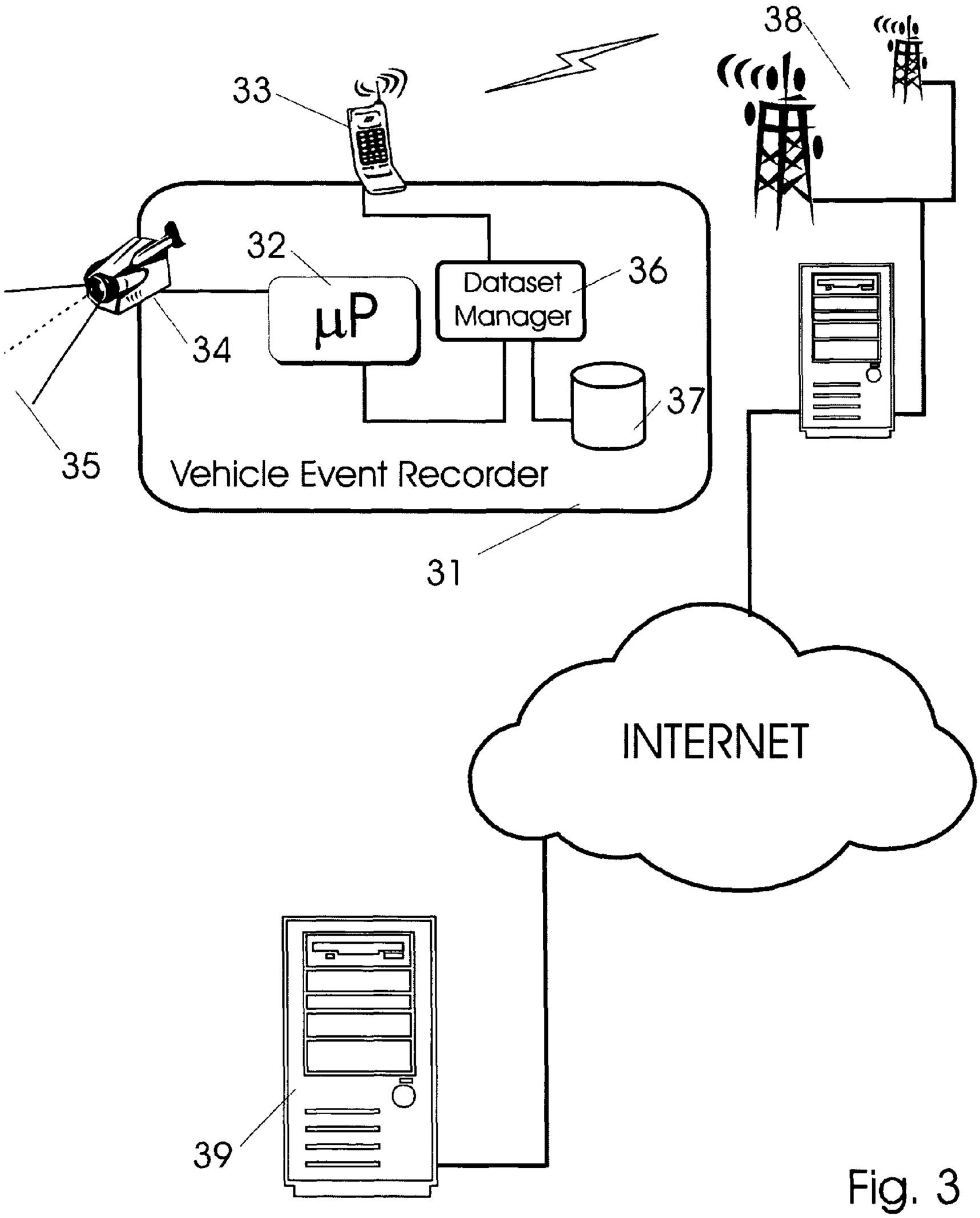

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μP
Dataset Manager
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Vehicle Event Recorder
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INTERNET
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Fig. 3

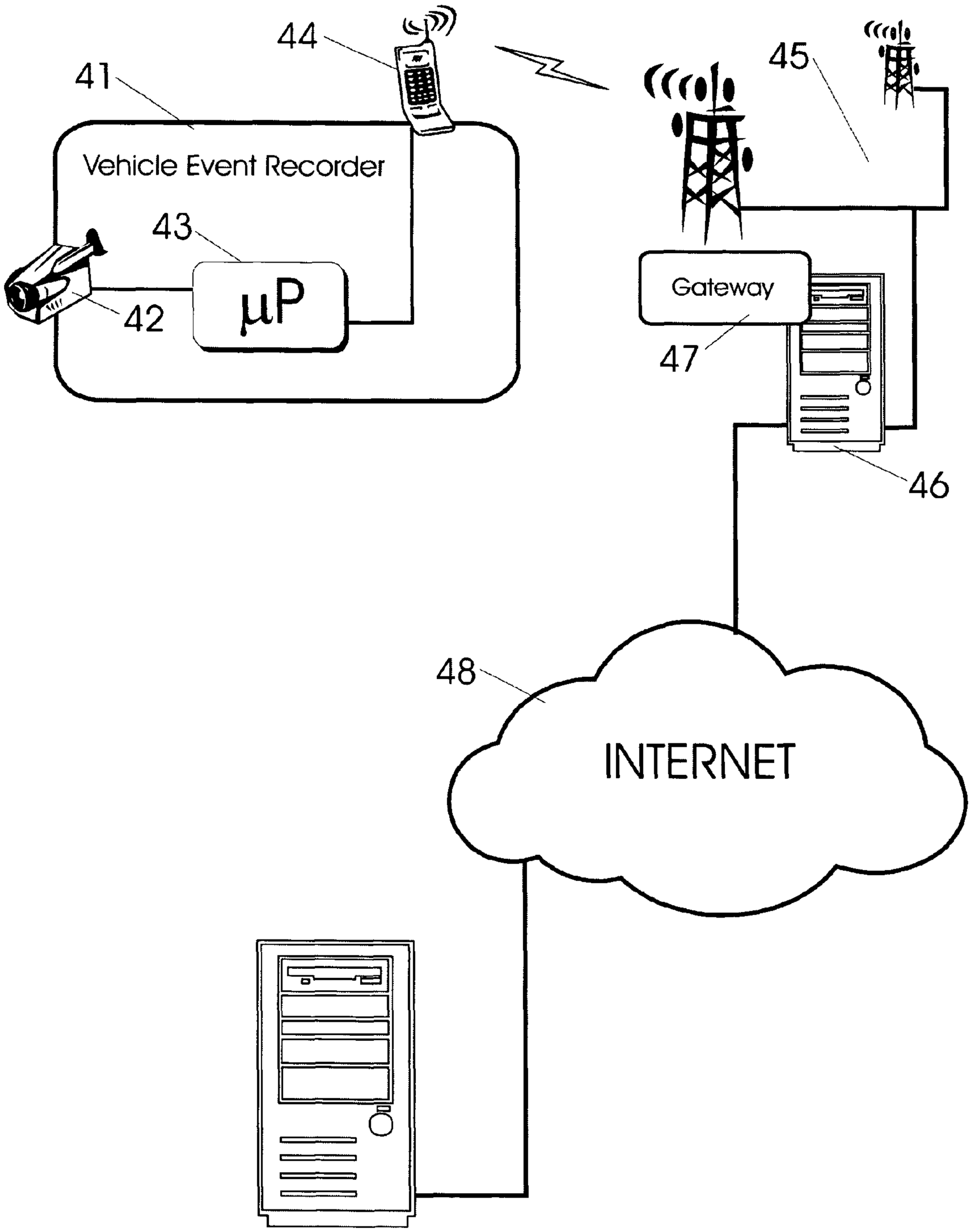

44
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Vehicle Event Recorder
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μP
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Gateway
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INTERNET

Fig. 4

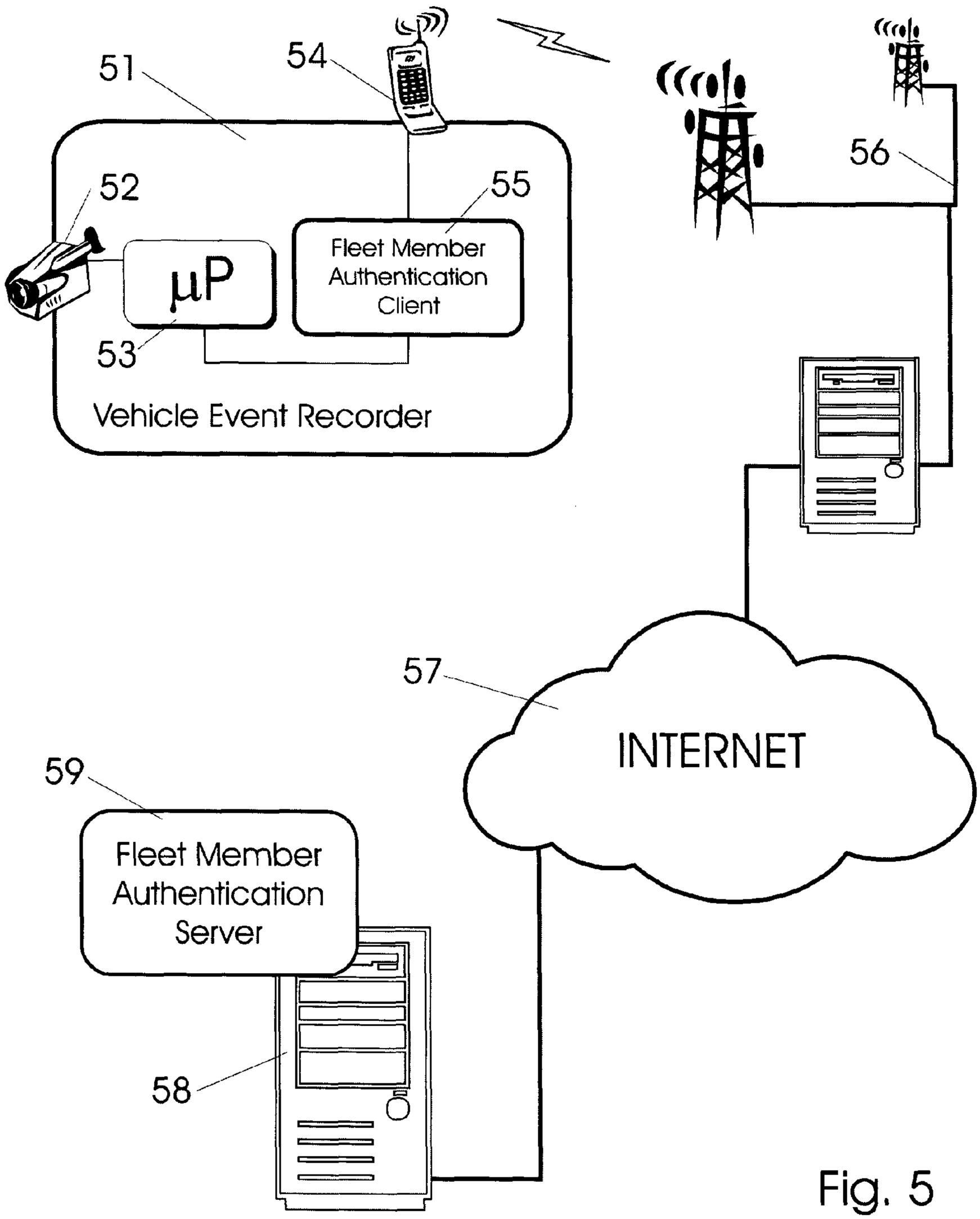

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μP
Fleet Member Authentication Client
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Vehicle Event Recorder
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INTERNET
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Fleet Member Authentication Server
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Fig. 5

VEHICLE EVENT RECORDER SYSTEMS AND NETWORKS HAVING INTEGRATED CELLULAR WIRELESS COMMUNICATIONS SYSTEMS

BACKGROUND OF THESE INVENTIONS

1. Field

The following inventions disclosure is generally concerned with vehicle event recorder systems and specifically concerned with vehicle event recorder systems having cellular wireless transceivers which couple with wireless communications networks.

2. Prior Art

The inventions presented in U.S. Pat. No. 6,947,817 by inventor Diem for nonintrusive diagnostic tools for testing oxygen sensor operation relates to a diagnostic system for testing a vehicle where such systems include a wireless communications link between a vehicle any remote network of server computers. In particular, a WiFi type access points allowed an analyzer to communicate by way the Internet with a server computer hosting and oxygen sensor SOAP (simple object access protocol) service. In a nutshell, the system relates to smog sensors for automobiles which communicate with remote servers by way of a WiFi communications links.

Video surveillance systems are used to provide video records of events, incidents, happenings, et cetera in locations of special interest. For example, retail banking offices are generally protected with video surveillance systems which provide video evidence in case of robbery. While video surveillance systems are generally used in fixed location scenarios, mobile video surveillance systems are also commonly used today.

In particular, video systems have been configured for use in conjunction with an automobile and especially for use with police cruiser type automobiles. As a police cruiser is frequently quite near the scene of an active crime, important image information may be captured by video cameras installed on the police cruiser. Specific activity of interest which may occur about an automobile is not always associated with crime and criminals. Sometimes events which occur in the environments immediately about an automobile are of interest for reasons having nothing to do with crime. In example, a simple traffic accident where two cars come together in a collision may be the subject of video evidence of value. Events and circumstances leading up to the collision accident may be preserved such that an accurate reconstruction can be created. This information is useful when trying come to a determination as to cause, fault and liability. As such, general use of video systems in conjunction with automobiles is quickly becoming an important tool useful for the protection of all. Some examples of the systems are illustrated below with reference to pertinent documents.

Inventor Schmidt presents in U.S. Pat. No. 5,570,127, a video recording system for a passenger vehicle, namely a school bus, which has two video cameras one for an inside bus view and one for a traffic view, a single recorder, and a system whereby the two cameras are multiplexed at appropriate times, to the recording device. A switching signal determines which of the two video cameras is in communication with the video recorder so as to view passengers on the passenger vehicle at certain times and passing traffic at other times.

Thomas Doyle of San Diego, Calif. and QUALCOMM Inc. also of San Diego, present an invention for a method and apparatus for detecting fault conditions in a vehicle data recording device to detect tampering or unauthorized access, in U.S. Pat. No. 5,586,130. The system includes vehicle sensors for monitoring one or more operational parameters of the vehicle. The fault detection technique contemplates storing a current time value at regular intervals during periods in which the recording device is provided with a source of main power. Inventor Doyle also teaches in the U.S. Pat. No. 5,815,071, a method and apparatus for monitoring parameters of vehicle electronic control units.

A "computerized vehicle log" is presented by Dan Kikinis of Saratoga Calif. in U.S. Pat. No. 5,815,093. The vehicle accident recording system employs a digital camera connected to a controller in nonvolatile memory, and an accident sensing interrupter. The oldest memory is overwritten by the newest images, until an accident is detected at which time the memory is blocked from further overwrites to protect the more vital images, which may include important information about the accident. Mr. Kikinis instructs that in preferred embodiments, the system has a communications port whereby stored images are downloaded after an accident to a digital device capable of displaying images. This feature is described in greater detail in the specification which indicates a wired download to a server having specialized image handling and processing software thereon.

Inventor Mr. Turner of Compton, Calif. no less, teaches an antitheft device for an automotive vehicle having both an audible alarm and visual monitor system. Video monitor operators are responsible for monitoring and handling an emergency situation and informing a 911 emergency station. This system is presented in U.S. Pat. No. 6,002,326.

A vehicle accident video recorder, in particular, a railroad vehicle accident video recorder, is taught by inventors Cox et al. In this system, a method and monitoring unit for recording the status of the railroad vehicle prior to a potential accident is presented. The monitoring unit continuously monitors the status of an emergency brake of the railroad vehicle and the status of a horn of the railroad vehicle. Video images are recorded and captured for a predetermined period of time after detecting that the emergency brake or horn blast has been applied as an event trigger. This invention is the subject of U.S. Pat. No. 6,088,635.

A vehicle crash data recorder is presented by inventor Ferguson of Bellaire, Ohio in U.S. Pat. No. 6,185,490. The apparatus is arranged with a three stage memory to record and retain information. And further it is equipped with a series and parallel connectors to provide instant on-scene access to accident data. It is important to note that Ferguson finds it important to include the possibility of on-site access to the data. Further, that Ferguson teaches use of a wired connection in the form of a serial or parallel hardwire connector. This teaching of Ferguson is common in many advanced systems configured as vehicle event recorders.

A traffic accident data recorder and traffic accident reproduction system and method is presented as U.S. Pat. No. 6,246,933. A plurality of sensors for registering vehicle operation parameters including at least one vehicle mounted digital video, audio camera is included for sensing storing and updating operational parameters. A rewritable, nonvolatile memory is provided for storing those processed operational parameters and video images and audio signals, which are provided by the microprocessor controller. Data is converted to a computer readable form and read by a computer such that an accident can be reconstructed via data collected.

U.S. Pat. No. 6,298,290 presented by Abe et al, teaches a memory apparatus for vehicle information data. A plurality of sensors including a CCD camera collision center of vehicle speed sensors, steering angle sensor, brake pressure sensor, acceleration sensor, are all coupled to a control unit. Further, the control unit passes information to a flash memory and a

RAM memory subject to an encoder. The information collected is passed through a video output terminal. This illustrates another hardwire system and the importance placed by experts in the art on a computer hardware interface. This is partly due to the fact that video systems are typically data intensive and wired systems are necessary as they have bandwidth sufficient for transfers of large amounts of data.

Mazzilli of Bayside, N.Y. teaches in U.S. Pat. No. 6,333,759 a 360° automobile video camera system. A complex mechanical mount provides for a single camera to adjust its viewing angle giving a 360° range for video recording inside and outside of an automotive vehicle.

U.S. Pat. No. 6,389,339 granted to Inventor Just, of Alpharetta, Ga. teaches a vehicle operation monitoring system and method. Operation of a vehicle is monitored with an onboard video camera linked with a radio transceiver. A monitoring service includes a cellular telecommunications network to view a video data received from the transceiver to a home-base computer. These systems are aimed at parental monitoring of adolescent driving. The mobile modem is designed for transmitting live video information into the network as the vehicle travels.

Morgan, Hausman, Chilek, Hubenak, Kappler, Witz, and Wright with their heads together invented an advanced law enforcement and response technology in U.S. Pat. No. 6,411,874 granted Jun. 25, 2002. A central control system affords intuitive and easy control of numerous subsystems associated with a police car or other emergency vehicle. This highly integrated system provides advanced control apparatus which drives a plurality of detector systems including video and audio systems distributed about the vehicle. A primary feature included in this device includes an advanced user interface and display system, which permits high level driver interaction with the system.

Inventor Lambert teaches in U.S. Pat. No. 6,421,080 a "digital surveillance system with pre-event recording". Pre-event recording is important in accident recording systems, because detection of the accident generally happens after the accident has occurred. A first memory is used for temporary storage. Images are stored in the temporary storage continuously until a trigger is activated which indicates an accident has occurred at which time images are transferred to a more permanent memory.

Systems taught by Gary Rayner in U.S. Pat. Nos. 6,389,340; 6,405,112; 6,449,540; and 6,718,239, each directed to cameras for automobiles which capture video images, both of forward-looking and driver views, and store recorded images locally on a mass storage system. An operator, at the end of the vehicle service day, puts a wired connector into a device port and downloads information into a desktop computer system having specialized application software whereby the images and other information can be played-back and analyzed at a highly integrated user display interface.

It is not possible in the systems Rayner teaches for an administrative operator to manipulate or otherwise handle the data captured in the vehicle at an off-site location without human intervention. It is necessary for a download operator to transfer data captured from the recorder unit device to a disconnected computer system. While proprietary 'DriveCam' files can be e-mailed or otherwise transferred through the Internet, those files are in a format with a can only be digested by desktop software running at a remote computer. It is necessary to have the DriveCam desktop application on the remote computer. In order that the files be properly read. In this way, data captured by the vehicles is totally unavailable to some parties having an interest in the data. Namely those parties who do not have access to a computer appropriately arranged with the specific DriveCam application software. A second and major disadvantage is systems presented by Rayner includes necessity that a human operator service the equipment each day in a manual download action.

Remote reporting and manipulation of automobile systems is not entirely new. The following are very important teachings relating to some automobile systems having a wireless communications link component.

Inventors Fan et al, teach inventions of methods and systems for detecting vehicle collision using global positioning system GPS. The disclosure of Jun. 12, 2001 resulted in granted patent having U.S. Pat. No. 6,459,988. A GPS receiver is combined with wireless technology to automatically report accident and third parties remotely located. A system uses the GPS signals to determine when an acceleration value exceeds the preset threshold which is meant to be indicative of an accident having occurred.

Of particular interest include inventions presented by inventors Nagda et al., in the document U.S. Pat. No. 6,862,524 entitled using location data to determine trafficking route information. In this system for determining and disseminating traffic information or route information, traffic condition information is collected from mobile units that provide their location or position information. Further route information may be utilized to determine whether a mobile unit is allowed or prohibited from traveling along a certain route.

A common assignee, @Road Inc., owns the preceding two patents in addition to the following: U.S. Pat. Nos. 6,529,159; 6,552,682; 6,594,576; 6,664,922; 6,795,017; 6,832,140; 6,867,733; 6,882,313; and 6,922,566. As such, @Road Inc., must be considered a major innovator in position technologies arts as they relate to mobile vehicles and remote server computers.

General Motors Corp. teaches in U.S. Pat. No. 6,728,612, an automated telematics test system and method. The invention provides a method and system testing a telematics system in a mobile vehicle a test command from a test center to a call center is based on a test script. The mobile vehicle is continuously in contact by way of cellular communication networks with a remotely located host computer.

Inventor Earl Diem and Delphi Technologies Inc., had granted to them on Sep. 20, 2005, U.S. Pat. No. 6,947,817. The nonintrusive diagnostic tool for sensing oxygen sensor operation include a scheme or an oxygen analyzer deployed in a mobile vehicle communicates by way of an access point to a remotely located server. A diagnostic heuristic is used to analyze the data and confirm proper operation of the sensor. Analysis may be performed by a mainframe computer quickly note from the actual oxygen sensor.

Similar patents including special relationships between mobile vehicles and remote host computers include those presented by various inventors in U.S. Pat. Nos. 6,735,503; 6,739,078; 6,760,757; 6,810,362; 6,832,141; and 6,850,823.

Another special group of inventions owned by Reynolds and Reynolds Holding Inc., is taught first by Lightner et al, in U.S. Pat. No. 6,928,348 issued Aug. 9, 2005. In these inventions, Internet based emission tests are performed on vehicles having special wireless couplings to computer networks. Data may be further transferred to entities of particular interest including the EPA or California Air Resources Board, for example, or particular insurance companies and other organizations concerned with vehicle emissions and environment.

Other patents held by Reynolds and Reynolds Holding Inc., include those relating to reporting of automobile performance parameters to remote servers via wireless links. Specifically, an onboard data bus OBD system is coupled to a microprocessor, by way of a standard electrical connector. The microprocessor periodically receives data and transmits it into the wireless communications system. This information is more fully described in U.S. Pat. No. 6,636,790 granted Oct. 21, 2003. Inventors Lightner et al, present method and apparatus for remotely characterizing the vehicle performance. Data at the onboard data by his periodically received by a microprocessor and passed into a local transmitter. The invention specifically calls out transmission of data on a predetermined time interval. Thus these inventions do not anticipate nor include processing and analysis steps which result in data being passed at time other than expiration of the predetermined time period.

Reynolds and Reynolds Holding Inc., further describes systems where motor vehicles are coupled by wireless communications links to remote host servers in U.S. Pat. No. 6,732,031.

While systems and inventions of the arts are designed to achieve particular goals and objectives, some of those being no less than remarkable, these inventions have limitations which prevent their use in new ways now possible. Inventions of the art are not used and cannot be used to realize the advantages and objectives of the inventions taught herefollowing.

SUMMARY OF THESE INVENTIONS

Comes now, James Plante with inventions of vehicle event recorder systems having integrated cellular wireless communications links.

Vehicle event recorders including those provided with imaging means, are arranged to monitor vehicle use and to collect images of scenes occurring about the vehicle's environments among other vehicle performance and use data. Further, these systems are arranged to collect data associated with a particular moment in time, or an "event" and to preserve that data for post event review.

In accordance with some preferred versions of these inventions, a detailed or 'complete' dataset is parsed, compressed and otherwise reduced into a data subset of limited size. Thus, an "abbreviated" dataset is a data subset which may be more readily transmitted on limited bandwidth systems. While an abbreviated dataset is passed into the network in near real time, a complete dataset may be preserved locally for transmission at a later time when a higher bandwidth link becomes available.

As such, vehicle event recorder systems of these inventions are deployed in conjunction with wireless mobile telephone type communications networks. A video camera, vehicle systems transducers, and other measurement systems associated with vehicle use all operate to collect data during the service use of a vehicle. On the occurrence of an "event", for example, a traffic accident, data is captured and preserved in a special onboard memory. Further, a parsing module is provided to extract the most important information which may be represented in a dataset of reduced size. Accordingly, these systems may be characterized in summary as including vehicle event recorders with a video camera, microprocessor, memory, parsing module, and a mobile wireless communications transceiver; further, those vehicle event recorders in communication with a mobile wireless base station, gateway, Internet and remote application specific server.

Objectives of these Inventions

It is a primary object of these inventions to provide new vehicle fleet management tools.

It is an object of these inventions to provide vehicle fleet management systems having a video component.

It is a further object to provide vehicle fleet management systems arranged with high performance mobile network connectivity and function.

It is an object of these inventions to provide video based vehicle fleet management systems in conjunction with ubiquitous, always-on, mobile wireless networks.

An object of these inventions includes provision of video based vehicle fleet management systems in conjunction with cellular type wireless networks.

A better understanding can be had with reference to detailed description of preferred embodiments and with reference to appended drawings. Embodiments presented are particular ways to realize these inventions and are not inclusive of all ways possible. Therefore, there may exist embodiments that do not deviate from the spirit and scope of this disclosure as set forth by appended claims, but do not appear here as specific examples. It will be appreciated that a great plurality of alternative versions are possible.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

These and other features, aspects, and advantages of the present inventions will become better understood with regard to the following description, appended claims and drawings where:

FIG. **1** is a schematic diagram of vehicle event recorder systems including a vehicle event recorder in relation with a compound network;

FIG. **2** is a diagram including special detail relating to memory management;

FIG. **3** presents in block diagram, versions of these systems along with special interfaces between some primary system elements;

FIG. **4** diagrams some important secondary elements; and finally

FIG. **5** illustrates a block schematic with specially arranged authentication clients/servers.

GLOSSARY OF SPECIAL TERMS

Throughout this disclosure, reference is made to some terms which may or may not be exactly defined in popular dictionaries as they are defined here. To provide a more precise disclosure, the following terms are presented with a view to clarity so that the true breadth and scope may be more readily appreciated. Although every attempt is made to be precise and thorough, it is a necessary condition that not all meanings associated with each term can be completely set forth. Accordingly, each term is intended to also include its common meaning which may be derived from general usage within the pertinent arts or by dictionary meaning. Where the presented definition is in conflict with a dictionary or arts definition, one must consider context of use and provide liberal discretion to arrive at an intended meaning. One will be well advised to error on the side of attaching broader meanings to terms used in order to fully appreciate the entire depth of the teaching and to understand all intended variations.

Cellular Wireless Communications Networks

The term 'cellular wireless communications networks' is intended to include those wireless networks having large coverage areas comprised of cells which further include 'handoff' mechanisms for nodes passing from one cell to another whereby a continuous connection is maintained.

Gateway

A 'gateway' is a coupling system used to interface together two independent systems whereby a protocol used on a first system is translated into a protocol used on a second system.

Managed Loop Memory

A 'managed loop memory' is a memory system arranged to preserve in detail data captured during a period immediately past with respect to any instant but to overwrite that data with newer data when that data has sufficiently aged in accordance with a predefined expiration definition.

Vehicle Environments

The environment in and about a vehicle includes those spaces interior or exterior with respect to the car body. That is to say, traffic ahead of, behind, towards the sides of, and inside the driver compartment are all included as vehicle environments.

Communications Port

Includes for example: cellular transceiver; WiFi; Network Interface card; serial port such as RS-232; among others.

PREFERRED EMBODIMENTS OF THESE INVENTIONS

In accordance with each of preferred embodiments of these inventions, vehicle event recorders with integrated cellular wireless communications systems are provided. It will be appreciated that each of embodiments described include an apparatus and that the apparatus of one preferred embodiment may be different than the apparatus of another embodiment presented in an alternative example.

Combinations of vehicle event recorders coupled with mobile telephone communications networks, the Internet, and special application-specific servers and databases form the basis of best modes of these inventions. In particular, a vehicle event recorder is comprised of a video camera, a mobile wireless type radio transceiver and microprocessor. The video camera is arranged to have a field-of-view including environments about a vehicle in which the recorder is installed—generally a forward-looking viewpoint and sometimes a vehicle driver compartment viewpoint. The video camera runs continuously while a vehicle is in use capturing images of scenes occurring about the vehicle. In the event of a traffic accident or some other physical anomaly, a video series including frames from before and after the accident are captured by way of a special memory management system. A microprocessor is electronically coupled to the mobile telephone transceiver whereby it can transmit/receive data to/from further into a network where it may couple with a remote server running application specific software. The wireless transceiver operates to convert electronic signals from the microprocessor into electromagnetic signals for free space transmission. These electromagnetic signals are received at either of the base stations belonging to the spatially distributed cells and converted back into electronic signals. Those electronic signals may be further transmitted via packet networks to remote servers for additional analysis and processing.

While vehicle event recorder arrangements have been suggested in conjunction with wireless communications networks, namely in U.S. patent application Ser. No. 11/299,028, that disclosure is hereby incorporated herein by explicit reference, those systems are limited with respect to the space in which download actions can be executed. In those systems, a vehicle performs its assigned service and thereafter returns to a download location; i.e. the vehicle enters a specially arranged space such that the vehicle is near to a WiFi transceiver base station or 'access point'. Such proximity condition is detected, and in response to detection of that condition a data transfer action causes data to be passed to the remote server. These systems require a vehicle to return to an approved download space in order that an authorized network connection be made. It is generally not possible to transfer data while the vehicle is active in the duty of its assignment.

In the present inventions, it is a primary feature that a vehicle is in continuous contact with the remote server while it is being used over extremely large regions. This is possible because a vehicle event recorder is coupled to a remoter server via links arranged in wireless cellular communications networks. These are quite distinct from previous wireless networks as they are formed of a great plurality of cooperating base stations well distributed to provide continuous coverage over extended area. A plurality of transmitters each spatially removed from another, each having a communication range which forms a partial overlap with the communication range of at least one other defines a coverage space, the extent of said coverage space being at least a few tens of cubic miles. Further distinction with regard to WiFi wireless systems which may include a plurality of transmitters all coupled to form a single network, cellular networks, more specifically those arranged as mobile telephone systems, include special handoff mechanisms whereby a mobile transceiver which passes from one cell to another cell maintains a seemingly continuous connection. In this way, the coverage space in which a connection may be maintained to extend over many hundreds of square miles.

To further improve range, wireless systems arranged as cellular networks use electromagnetic radiation of particular frequency and specialized antennae suitable for long-range transmissions. These electromagnetic signals are arranged, both in frequency and protocol, to cooperate with common mobile telecommunications networks. For example, these signals may be arranged in the frequency band between about 750 MHz and 2000 MHz. Some common cellular networks are build about the frequency bands having a center frequency at 900 MHz or 1800 MHz. For example, in a GSM frequency band is divided into 124 carrier frequencies, or subbands, spaced 200 kHz apart in a frequency division multiple access FDMA scheme. Each subband may be further divided into a time-sharing scheme, or TDMA time division multiple access system.

As the particular nature of vehicle event recorder systems and their use in fleet vehicles demands network connections which may be maintained continuously over very large ranges, the combination of a vehicle event recorder head with a cellular type wireless network should be viewed as particularly beneficial and cooperative in a synergistic way. The combination of vehicle event recorders with wireless cellular networks provides fantastic benefit. Among which includes continuing communication between a remote server and a vehicle during a service today. However, this combination is also accompanied by some disadvantage. The bandwidth of wireless cellular networks is not sufficiently adequate whereby high-resolution real-time video may be uploaded from an in-vehicle system. Accordingly, it is sometimes necessary to provide special means for forming datasets of reduced size which may be more readily transmitted over limited bandwidth networks such as common wireless cellular networks.

In a first of such systems, a vehicle event recorder head includes a local memory which is well managed in view of an overwrite scheme which discards unnecessary data of low value while preserving high value data for transmission to the remote server. In other systems, a complete dataset may be abbreviated with the abbreviated portion subject to instant

transmission and the complete dataset subject to non real-time transmission, but rather subject to a delayed transmission at times when network resources become more available. Thus, a high priority dataset and lower priority dataset may be formed in conjunction with a single event. The high priority dataset is of limited or reduced size and subject to instant transmission, the low priority dataset may be considerably larger but more permissive with respect to transmission delay.

These concepts and others are more readily understood in view of the following discussion with reference to numerals which is directed to FIGS. **1** through **5**. Particularly, the diagram of FIG. **1** illustrates vehicle event recorder systems in a schematic presentation. A vehicle event recorder head **1**, includes as primary, elements a video camera **2**, a wireless communications transceiver **3**, and a computer microprocessor **4**. These elements arranged in a common housing may be mounted conveniently within a vehicle for example, on the interior, near the dashboard behind the windshield. The combination including: a video camera; processor; mobile wireless communications link, prepared as a single unit suitable for integration with the vehicle is sometimes and herein called a 'vehicle event recorder head' or the 'head unit'. So long as a vehicle remains within the coverage space of the cellular network, images collected by the video camera may be processed by the microprocessor and transmitted through the cellular network to remote servers. A distribution of various cellular base stations **5** forms a coverage space **6** which may extend many tens of cubic miles. A plurality of these base stations operate in conjunction with one another by way of 'handoff' mechanisms to form the 'cellular' arrangement **7**. A vehicle passing from one cell to another cell seamlessly transfers communication from a first a base station to a second base station without ever having lost connection **8** to the network. In this way, data from a vehicle event recorder may be continuously transferred into the network even at times when a vehicle passes from a first cell to another. Thus very large continuous coverage areas are provided such that a vehicle event recorder mounted in a vehicle is continuously in contact with a remote server throughout the service day. Such advantage cannot be available in wired or fixed wireless systems having in comparison-severely limited range.

It is important to point out that an arrangement of these architectures includes a protocol translator between those communications protocols of wired networks and those communications protocols preferred on mobile wireless networks. Thus these vehicle event recorder systems may be considered as including a compound communications network comprised of a wireless side **8** and a wired side **9** with a protocol translator or 'gateway' **10** there between. Further these compound networks may also include the Internet **11** which may be connected **12** to remote server **13**, and still further to a mass storage database **14**.

Experts in the field will surely appreciate that a high-resolution video camera generates far too much data than which can be transmitted in real-time over a common wireless mobile cellular communications network. It is for this reason that in some versions a special memory system be adopted whereby high-resolution video can be collected and pre-processed before transmission over the wireless link. In a first scheme, a managed loop memory is arranged to receive video frames while simultaneously discarding older frames in accordance with a strategy which preserves most valuable data. Since only 'most valuable' data is transmitted, a limited communications link is not totally consumed by an unprocessed video stream.

In FIG. **2** it can be it further appreciated that a vehicle event recorder head **21** is comprised of a video camera **22**, a microprocessor **23**, a wireless mobile communications transceiver **24**, an advanced two-stage memory **25** comprising a managed-loop memory **26**, and a flash-type memory buffer **27**. Although video is continuously captured by the video camera and transferred to the managed loop memory portion, only on a toggle action of the event trigger **28** is data transferred from the loop to the flash memory buffer. The data set which is transferred to the flash memory buffer, may be considerably reduced in size when compared to an unprocessed continuous video stream. One will gain a further appreciation of these memory management arrangements, which are fully disclosed in detail in U.S. patent application filed Dec. 7, 2005 entitled: "Memory Management in Event Recording Systems" which is hereby incorporated into this disclosure by explicit reference.

While memory management techniques described above are considered preferred best modes, is explicitly noted and anticipated herein that many other schemes might be usefully deployed to reduce a continuous data stream collected by a video camera to an abbreviated dataset more suitable for transmission over limited bandwidth communications links. Accordingly, we consider a system architecture depicted in FIG. **3**. A vehicle event recorder head **31** is comprised of the microprocessor **32**, communications transceiver **33**, video camera **34** having field of view **35**, dataset manager **36**, and mass data storage buffer **37**. The dataset manager is arranged to receive video data and to process received data to produce an abbreviated dataset which has a reduced amount of data in comparison to a data heavy continuous video stream. Once a dataset manager produces an abbreviated dataset in the vehicle event recorder head, that abbreviated dataset may be transmitted by mobile communications transceiver into the cellular network **38**, and further through a wired network and to remote server **39**.

FIG. **4** illustrates another important element of these systems. Due to the specific physical nature of cellular communications networks, certain transmission protocols are required. However, wired networks have different characteristics, and thus different transmission protocols are used with those networks. When a compound network is formed of a wireless portion and a wired portion, a system must be put in place to translate from one protocol to another and perform the reverse operation for data traffic going in an opposing direction. This protocol translator is sometimes and herein called a 'gateway'. FIG. **4** illustrates a system having a gateway protocol translator between a wired portion and a wireless portion of a compound communications network. A vehicle event recorder head **41**, includes video camera **42**, microprocessor **43**, and cellular transceiver **44**. The cellular transceiver **44** may transmit and receive data messages in accordance with protocols used with wireless cellular networks such as W-CDMA, EvDO, GPRS, EDGE, PCS, CDMA, and GSM, among others.

Wireless cellular network **45** may include a base station **46**. The base station may have special gateway module **47** arranged to translate protocols associated wireless networks into protocols used more commonly with wired networks such as the Internet **48**. High speed wired type networks most commonly deploy transmission protocols such as those including: TCP/IP, UDP, XML, HTML data exchange formats among others. In this way, a vehicle event recorder system of these inventions includes a vehicle event recorder head in communication with a compound network including a wireless portion and a wired portion coupled together by way of a protocol gateway. In preferred versions, the wireless portion of these networks is arranged as a cellular mobile wireless network commonly used with mobile telephones. In

preferred versions, the wired portion of the network includes the Internet which supports remote location and widely available access to a system server.

Finally, FIG. **5** illustrates yet another important feature of these systems. As these systems are primarily directed to vehicle fleet management strategy, fleet member authentication client and server modules are to be included as part of a vehicle event recorder head and remote server respectively. A fleet member authentication client is a module which provides handshaking and identification functionality such that a particular vehicle event recorder associated with a particular vehicle, or vehicle and user/driver, to present itself as such to the fleet member authentication server module. In this way, a single remote server may be in communication with a plurality of vehicles and groups of vehicles all associated with a particular vehicle fleet. The remote server can thereafter manage event data received from various vehicles and sort it as part of the particular fleet and further manage access to the data with regard to particular fleet administrator. In the figure, vehicle event recorder head **51**, includes video camera **52**, microprocessor **53**, and wireless transceiver **54**. In addition vehicle event recorder head is integrated with a fleet member authentication client module **55**. When in communication with a remote server, the authentication module presents an identity scheme which is transmitted by cellular network **56** and further by wired network **57**. The remote server **58** is integrated with a fleet member authentication server module **59**. Calls from particular vehicle event recorders are received by the server and processed in accordance with their association with a specific fleet known to the server.

While in general a vehicle event recorder head is arranged to automatically connect wirelessly to the network in response to an event trigger, other actions may be arranged to initiate a data transfers. One such action includes that which occurs remote from the vehicle event recorder head. A systems administrator might initiate a request for information from a particular vehicle while operating in the field. The request is transmitted from the remote server, and hits the vehicle event recorder head to trigger a data transfer in agreement with the request. The request may be for a 'present instant' dataset which is generated at a vehicle event recorder head in real-time. Alternatively the request may be for a dataset associated with a prior instant; that dataset having been stored in a local memory. In either case, these systems are meant to include data-transfer actions and which are initiated by an administrator operating from a remote server station or other remote location.

In some versions of these inventions, it is necessary throttle data transmission in accordance with network congestion considerations. When a wireless cellular telephone network is very busy, the system resources should be allocated to those applications which require real-time data exchange. For example, a voice conversation is a real-time application that requires receipt of data without delay. However in most instances, data collected by a vehicle event recorder is not subject to compromise when it is received at a remote server with some reasonable delay. Accordingly, these systems are arranged such that the vehicle event recorder head is responsive in its data transmission activity as directed from an indicator provided by the network, the indicator being indicative of network capacity or network congestion. This function, among others may be taken up at a dataset manager.

While an 'Internet Server' is a general purpose server which can provide hosting and HTML response services to any requesting agent, the servers described here are not general purpose Internet servers. Rather, these servers include application-specific code. This code is particularly arranged with a view to support of vehicle event recorder systems. That is to say, servers are predefined in their function. Such that they are responsive to calls made by cooperating vehicle event recorder heads which have a priori knowledge of the existence of the server and the functions enabled therein. Thus proprietary calls and responses may be exchanged between an authorized vehicle event recorder head and a remote server suitable for receiving such calls from those authorized vehicle event recorders.

By way of example one such important function includes authentication services. In these systems, it is important that only authorized vehicle event recorder units be allowed to communicate with specific servers arranged to receive their communications. Thus both servers and vehicle event recorders are arranged with authentication modules. An authentication client is part of a vehicle event recorder unit; and an authentication server is part of the remote server suite of functionality. Thus, special relationships are formed between vehicle event recorders and associated remote servers. In this way, special fleet administration including fleet messaging may be established. Vehicle event recorders may operate in groups of cooperating units, these groups having further associations with entities such as business divisions or other logical groupings.

One will now fully appreciate how highly mobile vehicle event recorders are coupled to remote servers by way of wireless cellular communications networks to provide continuous links over greatly extended communications spaces. Although the present inventions have been described in considerable detail with clear and concise language and with reference to certain preferred versions thereof including best modes anticipated by the inventors, other versions are possible. Therefore, the spirit and scope of the invention should not be limited by the description of the preferred versions contained therein, but rather by the claims appended hereto.

It is claimed:

1. Vehicle event recorder systems comprising:

a video camera;

a microprocessor;

a wireless communications transceiver configured to wirelessly transmit information via a cellular communication network;

a managed loop memory configured to electronically store information;

a buffer memory configured to electronically store information; and

a server computer,

said video camera having a field-of-view coupled to environments about a vehicle and further having an electronic output coupled to said microprocessor,

said microprocessor electronically coupled to said wireless communications transceiver whereby image data captured by said video camera may be transmitted via electromagnetic radiation to said cellular communications network, said microprocessor configured to:

effectuate storage of the image data in the managed loop memory,

responsive to physical anomaly event triggers, transfer the image data electronically stored by the managed loop memory to the buffer memory in detailed complete datasets that correspond to individual physical anomaly event triggers, the detailed complete datasets including a first detailed complete dataset that corresponds to a first physical anomaly event trigger and a second detailed complete dataset that corresponds to a second physical anomaly event trigger, the first

detailed complete dataset comprising more bytes of data than the second detailed complete dataset;

compress the detailed complete datasets into abbreviated datasets, compressing including parsing the detailed complete datasets such that the abbreviated datasets comprise less bytes of data than the detailed complete datasets, the abbreviated datasets including a first abbreviated dataset that corresponds to the first detailed complete dataset and a second abbreviated dataset that corresponds to the second detailed complete dataset;

effectuate storage of the abbreviated datasets in the buffer memory, and

facilitate wireless transmission of the detailed complete datasets and the abbreviated datasets via the wireless communications transceiver based on an amount of available bandwidth in the cellular communication network,

wherein the microprocessor is configured to facilitate transmission of the first abbreviated dataset and the second abbreviated dataset responsive to the amount of available bandwidth being sufficient to permit transmission of the abbreviated datasets in real-time or near real-time, and

wherein the microprocessor is configured to facilitate transmission of the first and second detailed complete datasets responsive to the amount of available bandwidth being sufficient to permit transmission of the detailed complete datasets such that, the second detailed complete dataset is transmitted responsive to the amount of available bandwidth being sufficient for transmission of the second detailed complete dataset and then the first detailed complete dataset is transmitted responsive to the amount of available bandwidth being sufficient for transmission of the first detailed complete dataset;

said cellular communications network is coupled with said server computer, and

said server computer further comprises vehicle event recorder application specific software.

2. Vehicle event recorder systems of claim **1**, wherein the image data electronically stored by the managed loop memory includes video series images associated with a prescribed moment in time; said images include those captured prior to and after the prescribed moment, the prescribed moment corresponding to a given physical anomaly event trigger.

3. Vehicle event recorders comprising: a video camera; a microprocessor; and a cellular wireless transceiver, said cellular wireless transceiver and video camera are coupled to said microprocessor whereby images captured by said video camera are converted to first to electronic signals and thereafter to electromagnetic signals suitable for wireless transfer to cellular wireless network receiving base stations, further comprising a local memory buffer and download module, said local memory buffer being arranged to store image information associated with a plurality of events until the download module directs its transmission via said cellular wireless transceiver, the image information associated with the plurality of events including a first detailed complete dataset associated with a first event and a second detailed complete dataset associated with a second event, the first detailed complete dataset comprising more bytes of data than the second detailed complete dataset, the transmission based on an amount of available bandwidth in a cellular communication network associated with the cellular wireless transceiver and the cellular wireless network receiving base station such that the second detailed complete dataset is transmitted responsive to the amount of available bandwidth being sufficient for transmission of the second detailed complete dataset and then the first detailed complete dataset is transmitted responsive to the amount of available bandwidth being sufficient for transmission of the first detailed complete dataset.

4. Vehicle event recorders of claim **3**, said download module including a throttle responsive to a network availability measure whereby downloads are throttled in agreement with preferred network availability conditions.

5. Vehicle event recorders comprising: a video camera; a microprocessor; and a cellular wireless transceiver, said cellular wireless transceiver and video camera are coupled to said microprocessor whereby images captured by said video camera are converted to first to electronic signals and thereafter to electromagnetic signals suitable for wireless transfer to cellular wireless network receiving base stations based on an amount of available bandwidth in a cellular communication network associated with the cellular wireless transceiver and the cellular wireless network receiving base stations,

said images including first images and second images, the first images comprising more bytes of data than the second images, the wireless transfer including a wireless transfer of the second images responsive to the amount of available bandwidth being sufficient for transmission of the second images and then a wireless transfer of the first images responsive to the amount of available bandwidth being sufficient for transmission of the first images,

the vehicle event recorders further comprising a fleet member authentication client, said fleet member authentication client arranged to transact authentication procedures with a remote server whereby only authorized connections are permitted.

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