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United States Patent [19]

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Sheffer et al.

[45] Date of Patent: **Dec. 1, 1998**

[54] **MOBILE TELEPHONE LOCATION SYSTEM AND METHOD**

5,394,158	2/1995	Chia	342/457
5,434,904	7/1995	Tsuzuki et al.	379/58
5,515,419	5/1996	Sheffer	379/58
5,602,903	2/1997	LeBlanc et al.	379/60

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FOREIGN PATENT DOCUMENTS

[73] Assignee: **Trackmobile, Inc.**, San Diego, Calif.

0417944 3/1991 European Pat. Off. .

[21] Appl. No.: **543,031**

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[22] Filed: **Oct. 13, 1995**

[57] ABSTRACT

[51] **Int. Cl.⁶** **G01S 3/02**

[52] **U.S. Cl.** **342/457; 455/32.1; 455/33.1**

[58] **Field of Search** **342/457; 455/32.1, 455/33.1, 54.1, 56.1**

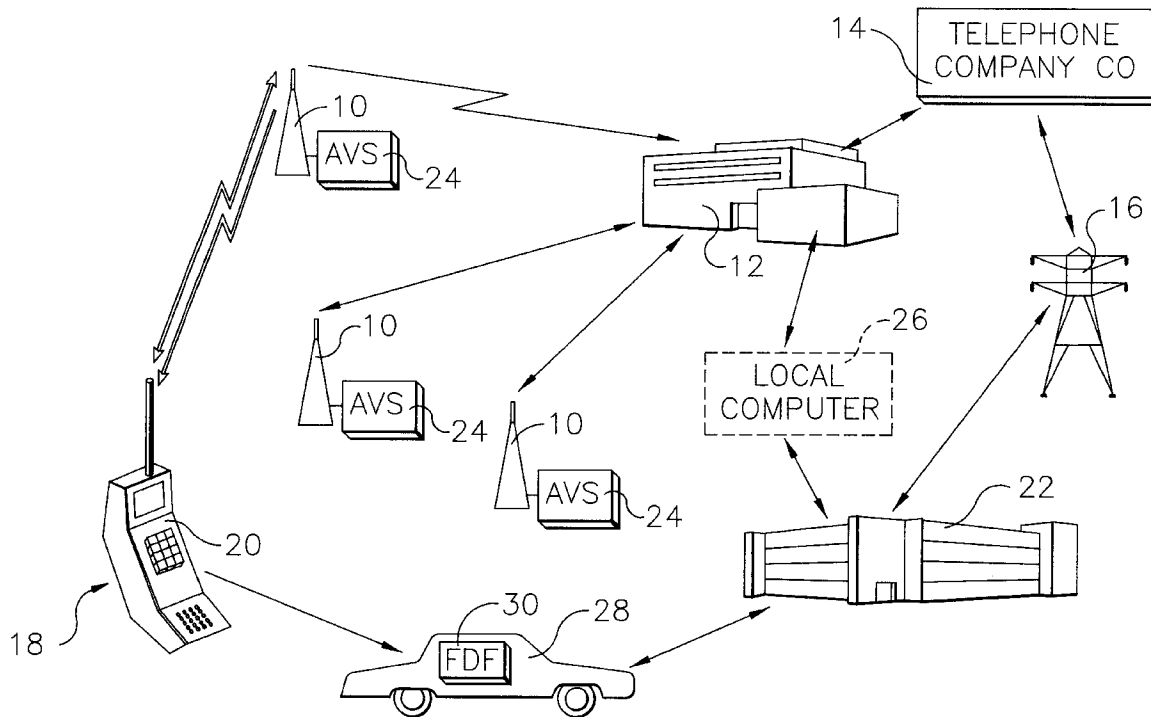
A wireless network based location system and method uses an existing wireless communication network to locate the position of any active phone or transceiver unit in the network. The system includes a plurality of agile vector sensor units, one each installed at each antenna site in the network, and a remote central monitoring station to which wireless network users can call for assistance in the event of an emergency. The system is designed to locate a portable phone transceiver unit using the reverse voice channel signal transmitted by the transceiver unit. Each agile vector sensor unit locks onto the reverse voice channel to determine azimuth and signal strength in the reverse voice channel, and also tracks any changes in voice channel by monitoring the forward voice channel. In the event of a voice channel change, the sensor unit tunes to the new voice channel. The azimuth, signal strength, and reverse voice channel information collected is used to track the location of a transceiver unit in real time.

[56] References Cited

U.S. PATENT DOCUMENTS

4,177,466	12/1979	Reagan	343/112 TC
4,704,734	11/1987	Menich et al. .	
4,726,050	2/1988	Menich et al. .	
4,728,959	3/1988	Maloney et al.	342/457
4,730,187	3/1988	Menich et al. .	
4,742,357	5/1988	Rackley	342/457
4,891,650	1/1990	Sheffer	342/457
5,055,851	10/1991	Sheffer	342/457
5,203,009	4/1993	Bogusz et al.	455/33.1
5,218,367	6/1993	Sheffer et al.	342/457
5,293,642	3/1994	Lo	455/33.1
5,293,645	3/1994	Sood	455/54.1
5,317,323	5/1994	Kennedy et al.	342/457
5,327,144	7/1994	Stilp et al.	342/387

25 Claims, 13 Drawing Sheets



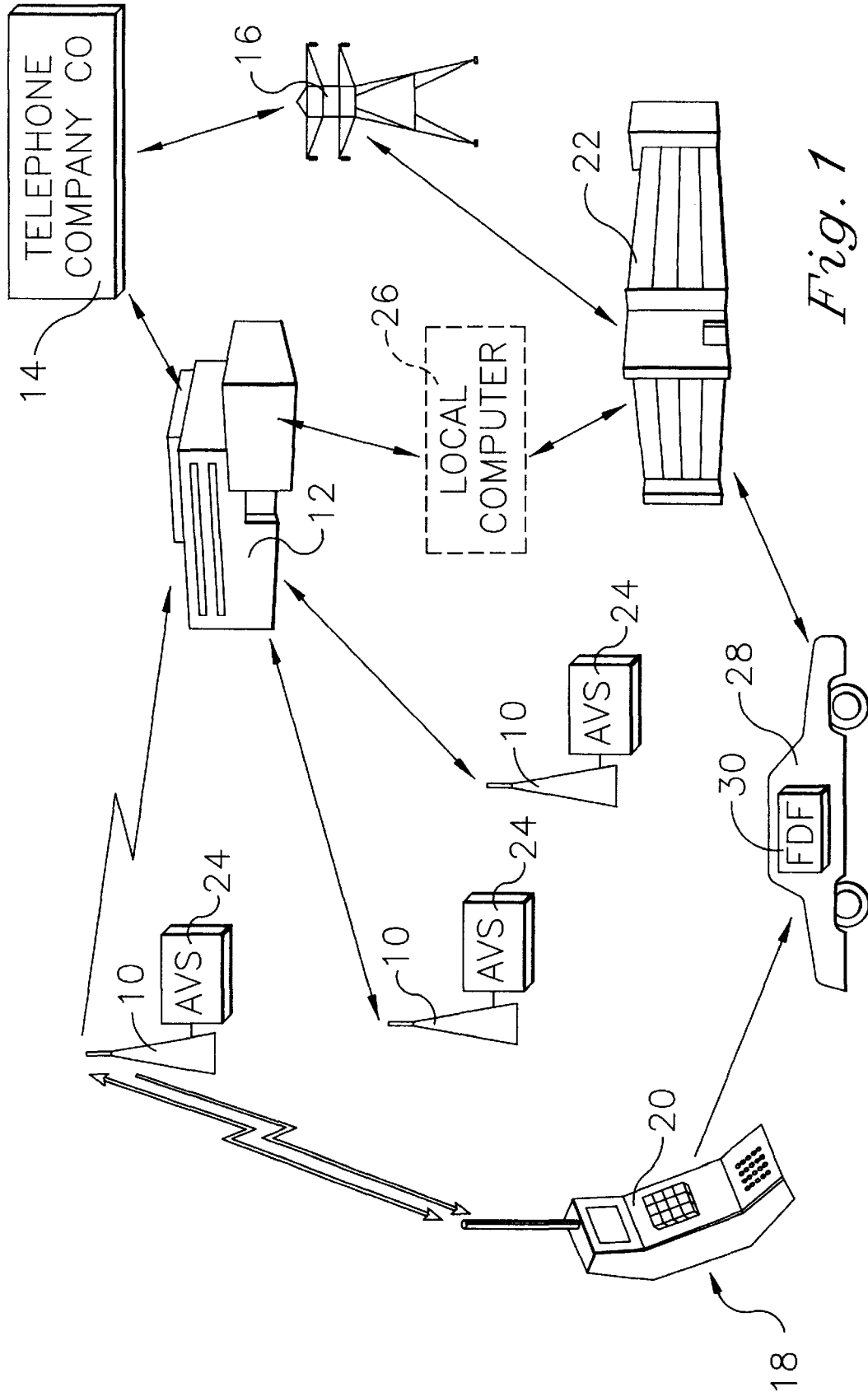
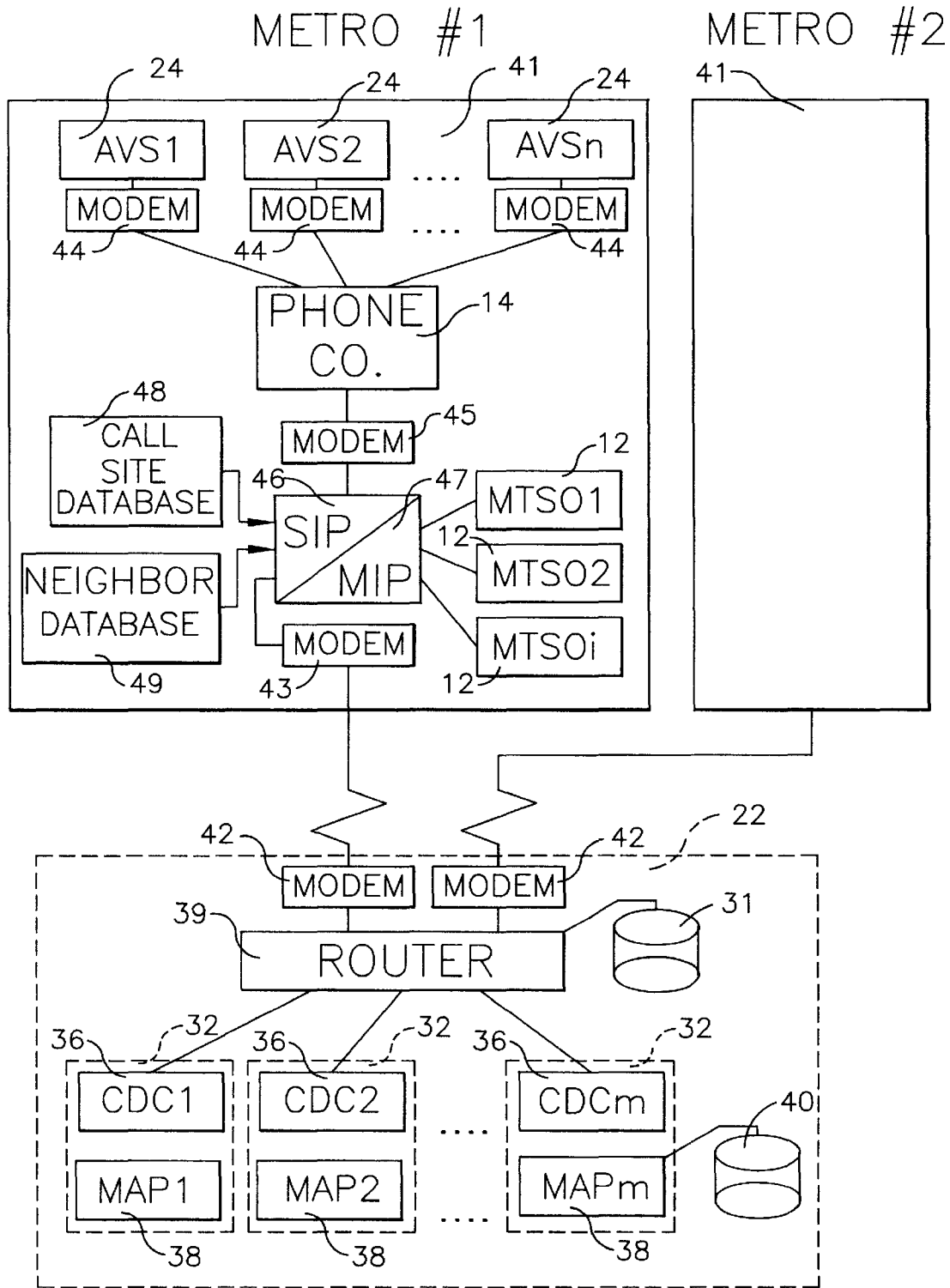


Fig. 1



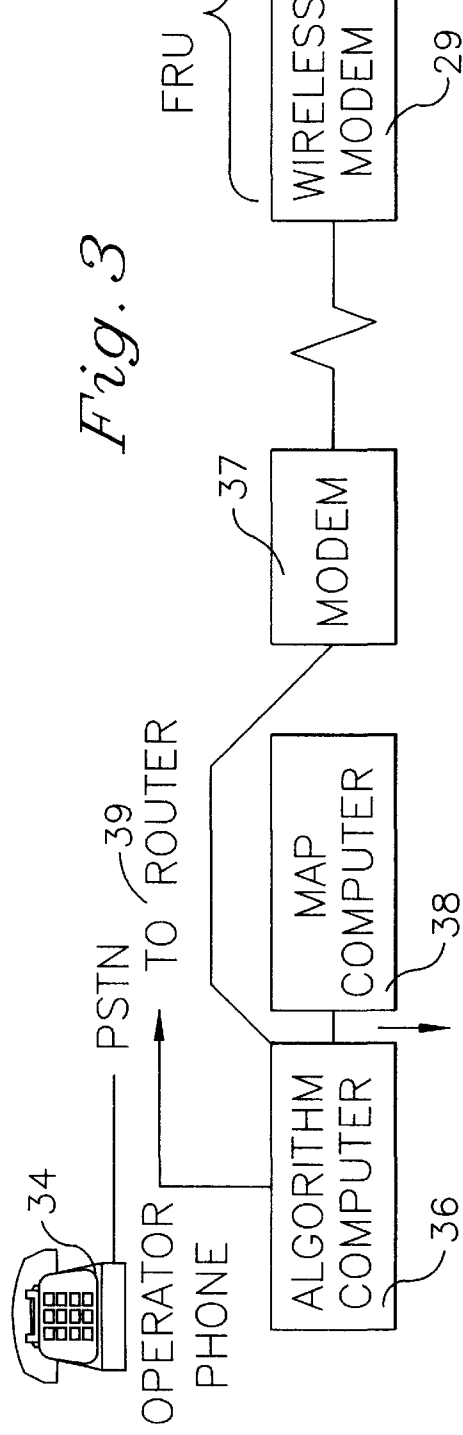


Fig. 3

71		72		73		74		75		76		77	
TIME STAMP	Ch.#	RSSI	AZIMUTH	MIN1	MIN2	VMC	SCC						
1111001..1110110	1	-88	10										
1111001..1110111	2	-86	320										
1111001..1111000	7	-94	17										
1111001..1111000	100	-45	27										
1111001..1111000	103			XXX	YYY	6	2						
1111001..1111000	25					2	1						
1111001..0001000	1023	-75	33	ABC	DEF	3	1						

Fig. 6

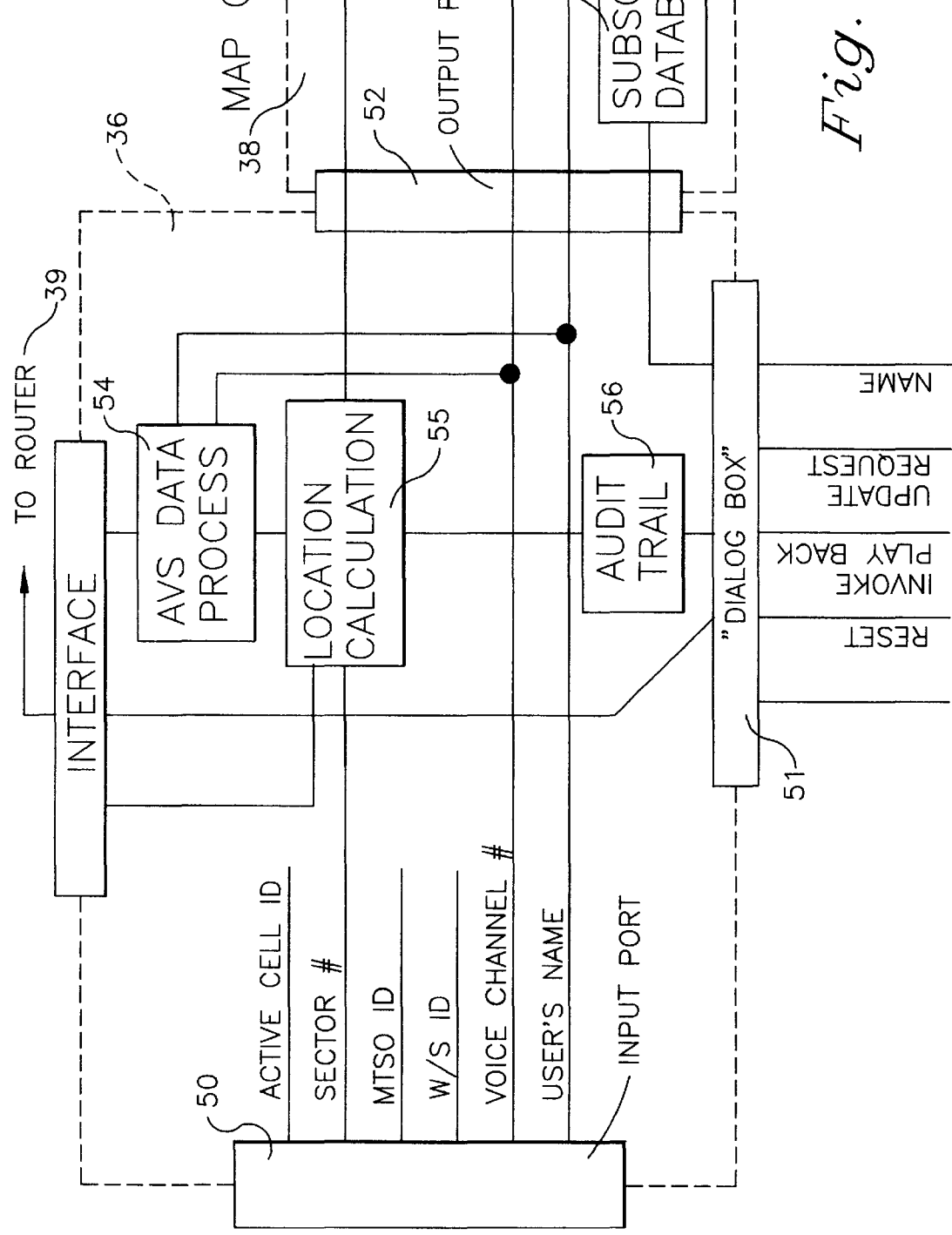


Fig.

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