



US005243530A

**United States Patent** [19]  
**Stanifer et al.**

[11] **Patent Number:** **5,243,530**  
 [45] **Date of Patent:** **Sep. 7, 1993**

- [54] **STAND ALONE MULTIPLE UNIT TRACKING SYSTEM**
- [75] **Inventors:** Samuel D. Stanifer, Camarillo; Marcus W. Woodard, Oxnard, both of Calif.
- [73] **Assignee:** The United States of America as represented by the Secretary of the Navy, Washington, D.C.
- [21] **Appl. No.:** 736,560
- [22] **Filed:** Jul. 26, 1991
- [51] **Int. Cl.<sup>5</sup>** ..... G06F 15/50
- [52] **U.S. Cl.** ..... 364/452; 364/516; 340/990
- [58] **Field of Search** ..... 364/452, 449, 514, 516; 340/990, 991, 992, 993, 995; 342/389, 457; 73/178 R; 370/94.1

- 5,032,845 7/1991 Velasco ..... 342/457
- 5,153,836 10/1992 Fraughton et al. .... 364/452
- 5,155,689 10/1992 Worthham ..... 364/449

**OTHER PUBLICATIONS**

GPS-Based Vessel Position Monitoring and Display System; Reynolds et al.; IEEE AES Magazine; Jul. 1990; pp. 16-22.

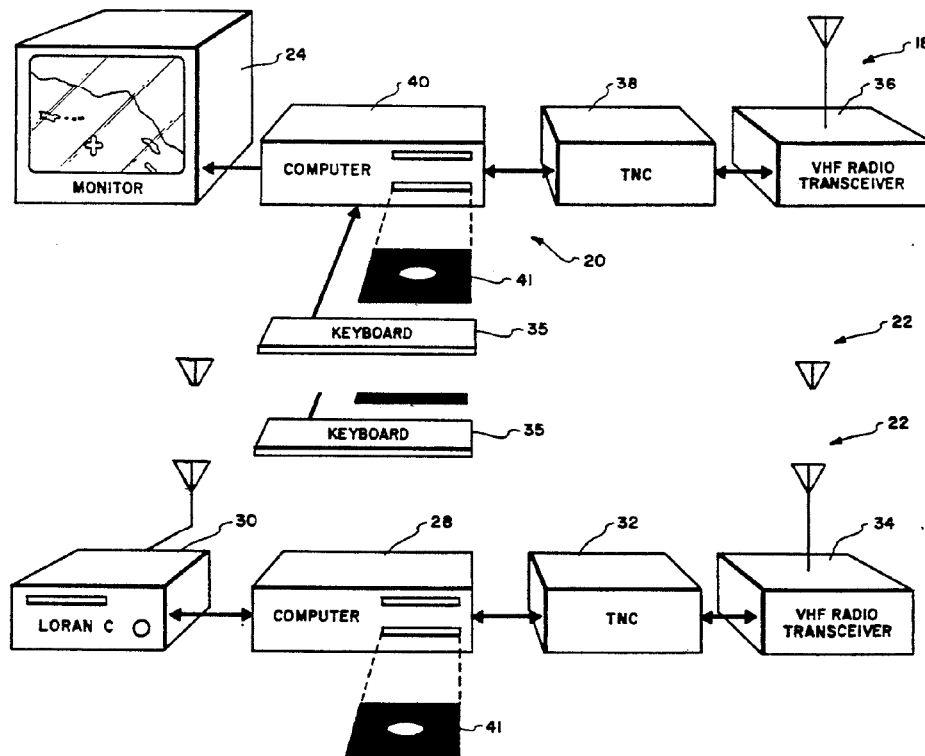
*Primary Examiner*—Thomas G. Black  
*Assistant Examiner*—Michael Zanelli  
*Attorney, Agent, or Firm*—David S. Kalmbaugh; Melvin J. Sliwka

**ABSTRACT**

[57] A stand alone multiple unit tracking system which utilizes a packet radio link to periodically transmit information identifying the geographic position of ships, aircraft and other land mobile vehicles. The stand alone multiple unit tracking system comprises a base station, relay stations and a plurality of remote stations placed on board ships, aircraft or the like. The remote stations transmit latitude and longitude position information to the base station through relay stations, if required, using packet radio techniques.

- [56] **References Cited**
- U.S. PATENT DOCUMENTS**
- 4,318,105 3/1982 Brodeur ..... 342/389
- 4,428,057 1/1984 Setliff et al. .... 364/449 X
- 4,513,377 4/1985 Hasebe et al. .... 364/449
- 4,777,489 10/1988 Allan ..... 342/176
- 4,791,572 12/1988 Green, III et al. .... 364/452
- 4,989,204 1/1991 Shimizu et al. .... 370/94.1

6 Claims, 8 Drawing Sheets



**Liberty Mutual**  
**Exhibit 1007**

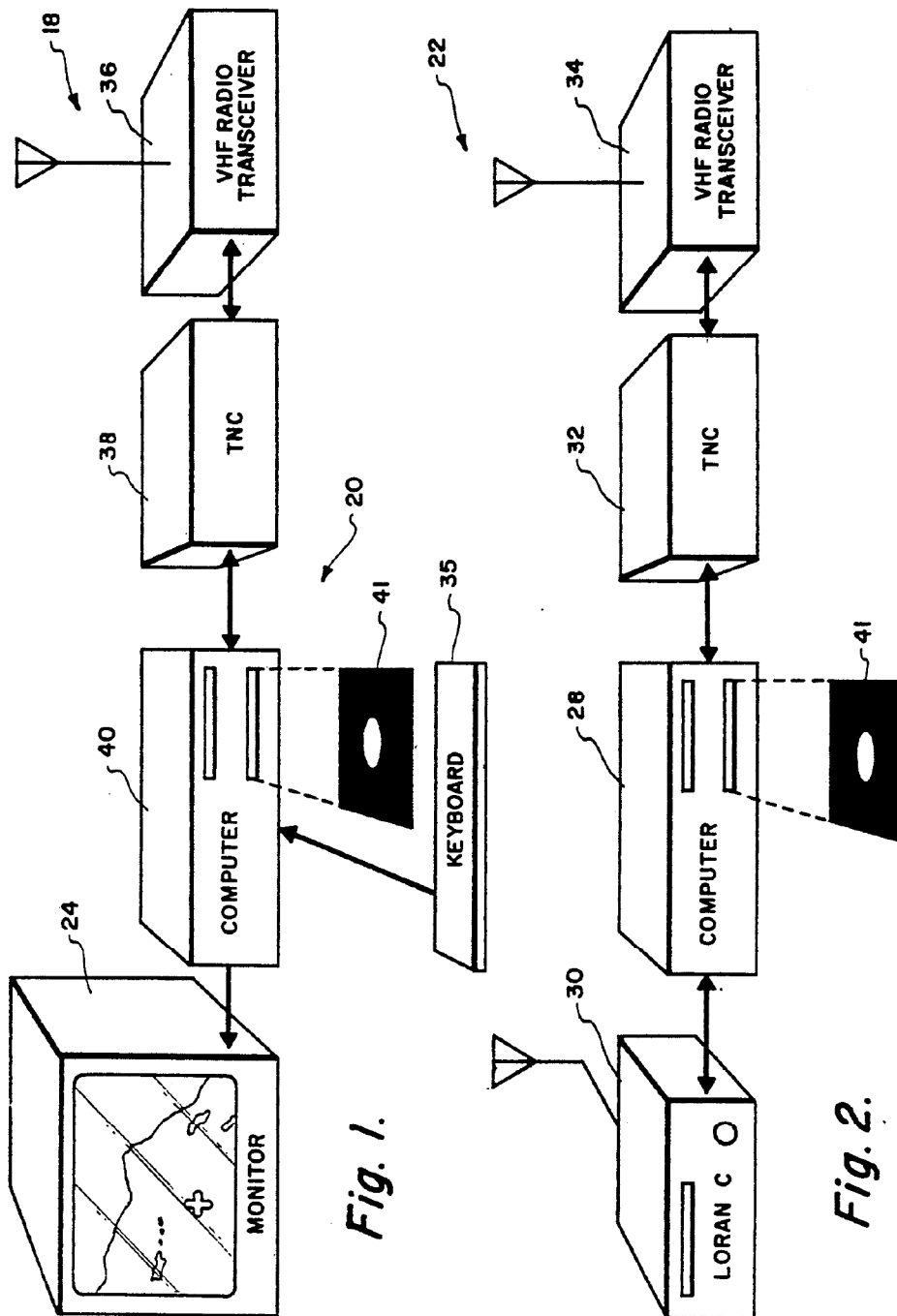


Fig. 1.

Fig. 2.

50	52	56	58	60	62	64	54
FLAG	ADDRESS	CONTROL	PID	INFO.	FCS	FLAG	
01111110	112/560 BITS	8 BITS	8 BITS	N*8 BITS	16 BITS	01111110	

Fig. 3.

	INFORMATION			STATUS		
	INITILIZE TNC	REPORT MODE	POSITION REPORT <sup>1</sup>	TERMINATE	QUIESCENT STATE	NORMAL STATE
CONTROL	10 <sub>H</sub>	10 <sub>H</sub>	0 OR 10 <sub>H</sub>	10 <sub>H</sub>	15 <sub>H</sub>	11 <sub>H</sub>
PID	F0 <sub>H</sub>	F0 <sub>H</sub>	F0 <sub>H</sub>	F0 <sub>H</sub>	N/U	N/U
INFO. 1	51 <sub>D</sub>	52 <sub>D</sub>	49 <sub>D</sub>	53 <sub>D</sub>	N/U	N/U
2	85 <sub>D</sub> <sup>2</sup>	21 <sub>D</sub> <sup>2</sup>	60 <sub>D</sub> <sup>3</sup>	21 <sub>D</sub> <sup>2</sup>		
3	6 <sub>D</sub> <sup>2</sup>		45 <sub>D</sub> <sup>3</sup>			
4			146 <sub>D</sub> <sup>3</sup>			
5			50 <sub>D</sub> <sup>3</sup>			
6			52 <sub>D</sub> <sup>3</sup>			
7			5 <sub>D</sub> <sup>3</sup>			
8			187 <sub>D</sub> <sup>3</sup>			

1. POSITION REPORT INDICATES A POSITION OF -119.1228 DEGREES LONGITUDE BY 34.1042 DEGREES LATITUDE.
2. VALUES DEPEND ON NUMBER OF REMOTE STATIONS/SITES.
3. VALUES VARY WITH REMOTE STATION POSITION.

Fig. 5.

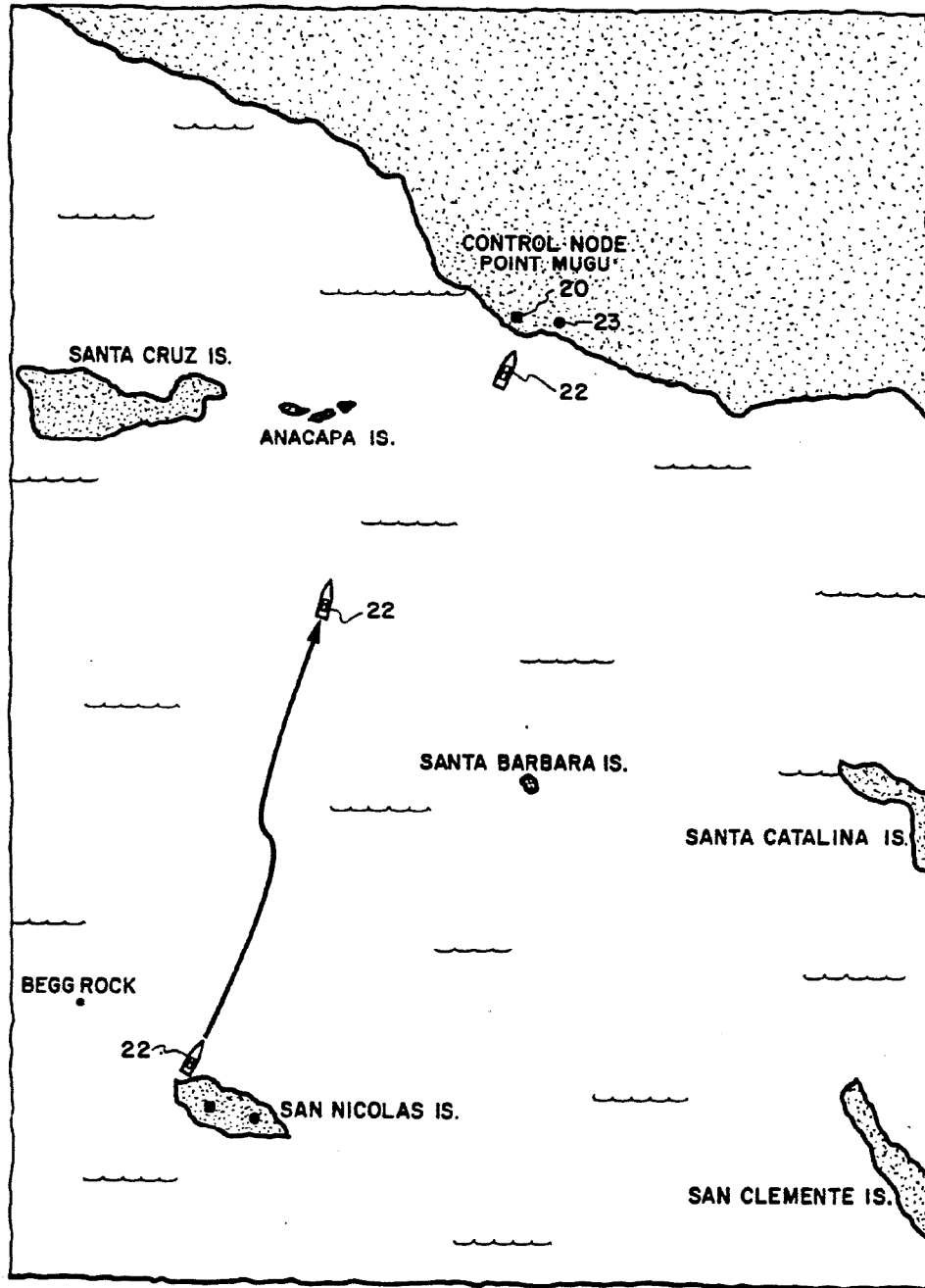


Fig. 4.

COLUMN BYTE	BASE STATION BAST 2	REMOTE SITE REMS
0	OUTPUT BUFFER NUMBER	NOT USED
1	REPORT INTERVAL	NOT USED
2	BIT 0 - REPORTER BIT 1 - RELAYER	RELAYS PACKED FLAG
3	RETRY COUNTER	NOT USED
4	=0 - NO RELAY >0 - LAST RELAY REFERENCE	=0 - NO RELAY >0 - LAST RELAY REFERENCE
5	MSB ADDRESS CHARACTER	MSB ADDRESS CHARACTER
6	ADDRESS CHARACTER	ADDRESS CHARACTER
7	ADDRESS CHARACTER	ADDRESS CHARACTER
8	ADDRESS CHARACTER	ADDRESS CHARACTER
9	ADDRESS CHARACTER	ADDRESS CHARACTER
10	LSB ADDRESS CHARACTER	LSB ADDRESS CHARACTER
11	RELAYER 1 INDEX	RELAYER 1 INDEX
12	RELAYER 2 INDEX	RELAYER 2 INDEX
13	RELAYER 3 INDEX	RELAYER 3 INDEX
14	RELAYER 4 INDEX	RELAYER 4 INDEX
15	RELAYER 5 INDEX	RELAYER 5 INDEX
16	RELAYER 6 INDEX	RELAYER 6 INDEX
17	RELAYER 7 INDEX	RELAYER 7 INDEX
18	RELAYER 8 INDEX	RELAYER 8 INDEX

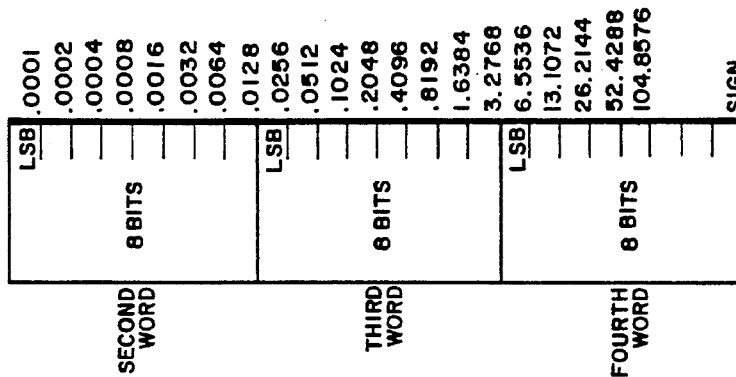


Fig. 6A.

Fig. 7.

# Explore Litigation Insights

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

## Real-Time Litigation Alerts



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

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

## Advanced Docket Research



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

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

## Analytics At Your Fingertips



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

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

## API

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

## LAW FIRMS

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

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

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.