United States Patent [19]

Vlcek et al.

[54] **FAST RESPONSE SYSTEM FOR A FLEET OF VEHICLES**

[75] Inventors: **Charles Vlcek**, Greenland, N.H.; **James Reynolds**, San Jose, Calif.

[73] Assignee: **Trimble Navigation Limited**, Sunnyvale, Calif.

[21] Appl. No.: **148,998**

[22] Filed: **Nov. 8, 1993**

[51] **Int. Cl.^{6}** **H04B 7/26**

[52] **U.S. Cl.** **455/53.1**; 455/54.1; 455/54.2

[58] **Field of Search** 455/12.1, 33.1, 455/54.1, 54.2, 56.1, 53.1, 57.1, 58.1; 340/988, 989

[56] **References Cited**

U.S. PATENT DOCUMENTS

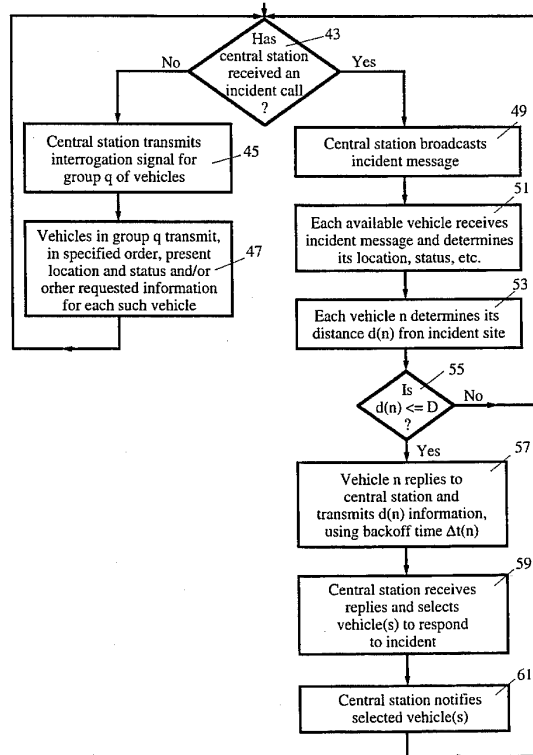|			
4,907,290	3/1990	Crompton	455/54.1
5,029,234	7/1991	Kawai et al.	455/54.1
5,068,654	11/1991	Husher	455/54.1

Primary Examiner—Edward F. Urban
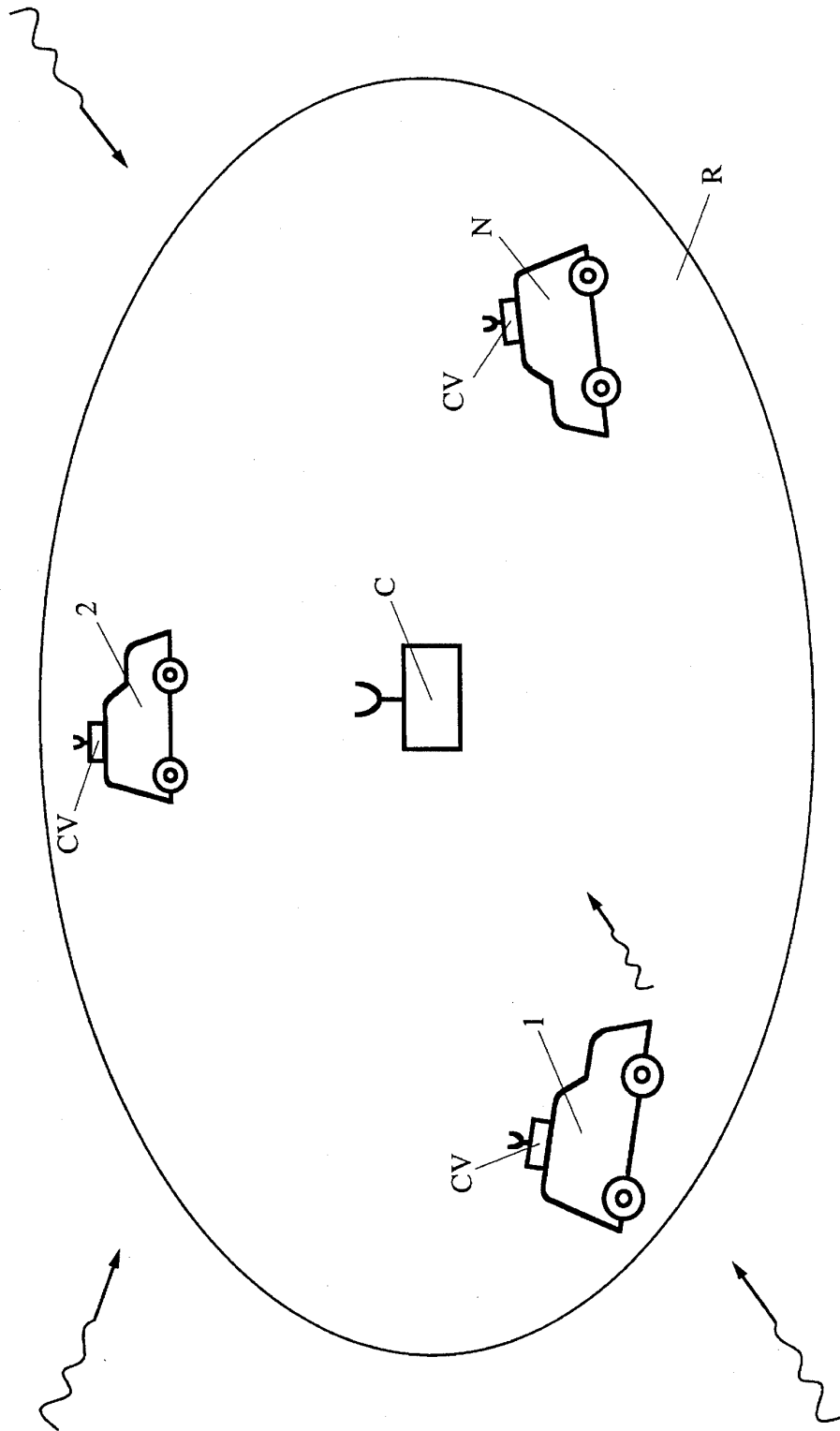*Assistant Examiner*—Thanh Le
Attorney, Agent, or Firm—John Schipper

[57] **ABSTRACT**

A method for directing a vehicle from a fleet of N vehicles, numbered n=1, 2, . . . , N(N≧2), to respond to a call for assistance received at a central processing station that communicates with a communications unit on each of these vehicles. The central station receives information by radio wave signals on the present location and present status of each vehicle on patrol at a sequence of times. Optionally, the vehicles may be divided into mutually exclusive groups, with each group reporting its location and status at separate times with different frequencies of reporting. An information response interval for a group includes a number of time slots, with each time slot allocated to a vehicle in the group so that no slot is empty. When the central station receives a call for assistance, an assistance message is transmitted to the fleet, specifying the site at which assistance is needed and any available information on the nature of the assistance required. Each available vehicle receives the assistance message and determines its distance d(n) from the assistance site. Each available vehicle whose distance d(n) is no greater than a selected distance D replies to the assistance message by transmitting its status and distance d(n) to the central station with a time delay that is proportional to d(n). Vehicle selection may be based upon first-to-reply and/or upon any specialized equipment or personnel training needed to respond. Vehicle location may be determined by GPS, GLONASS, Loran, or any other suitable location determination system.
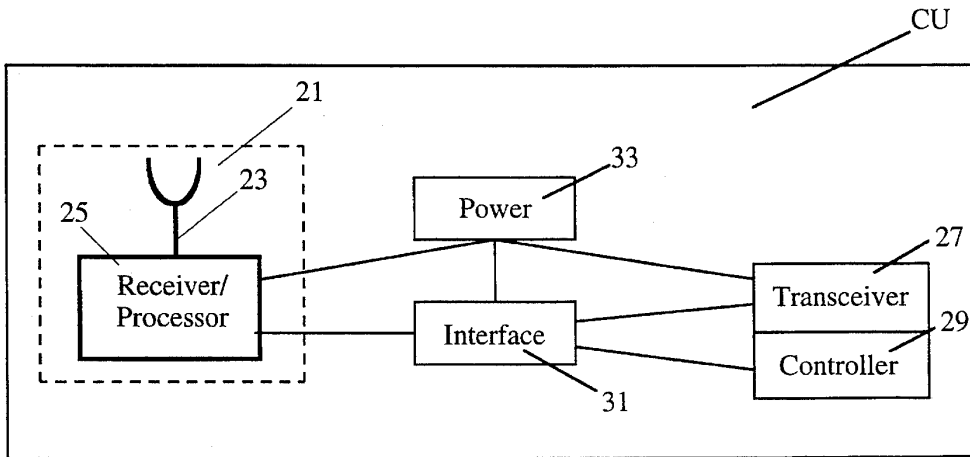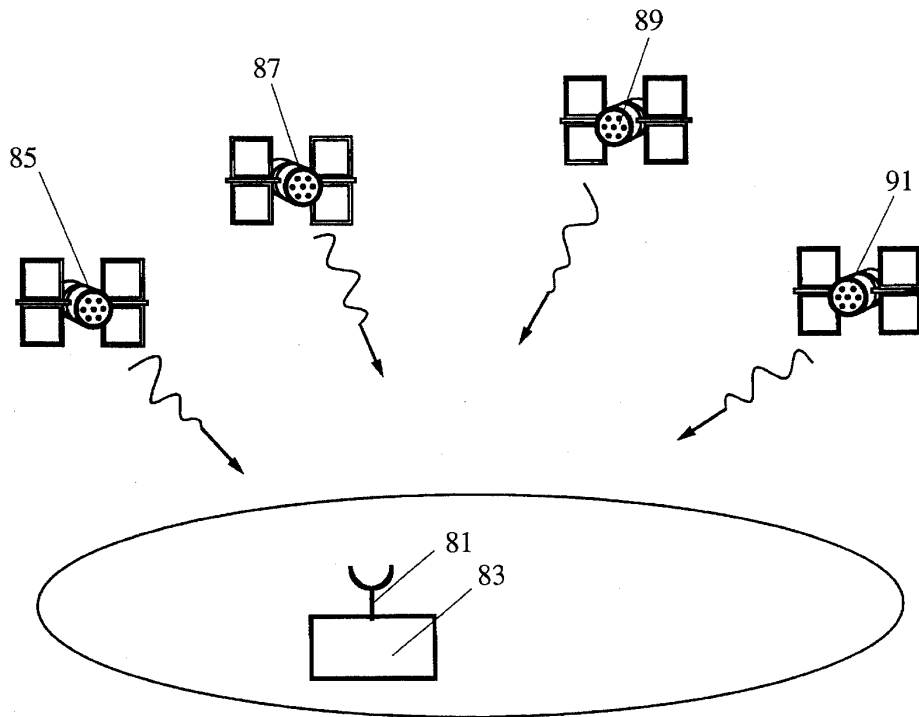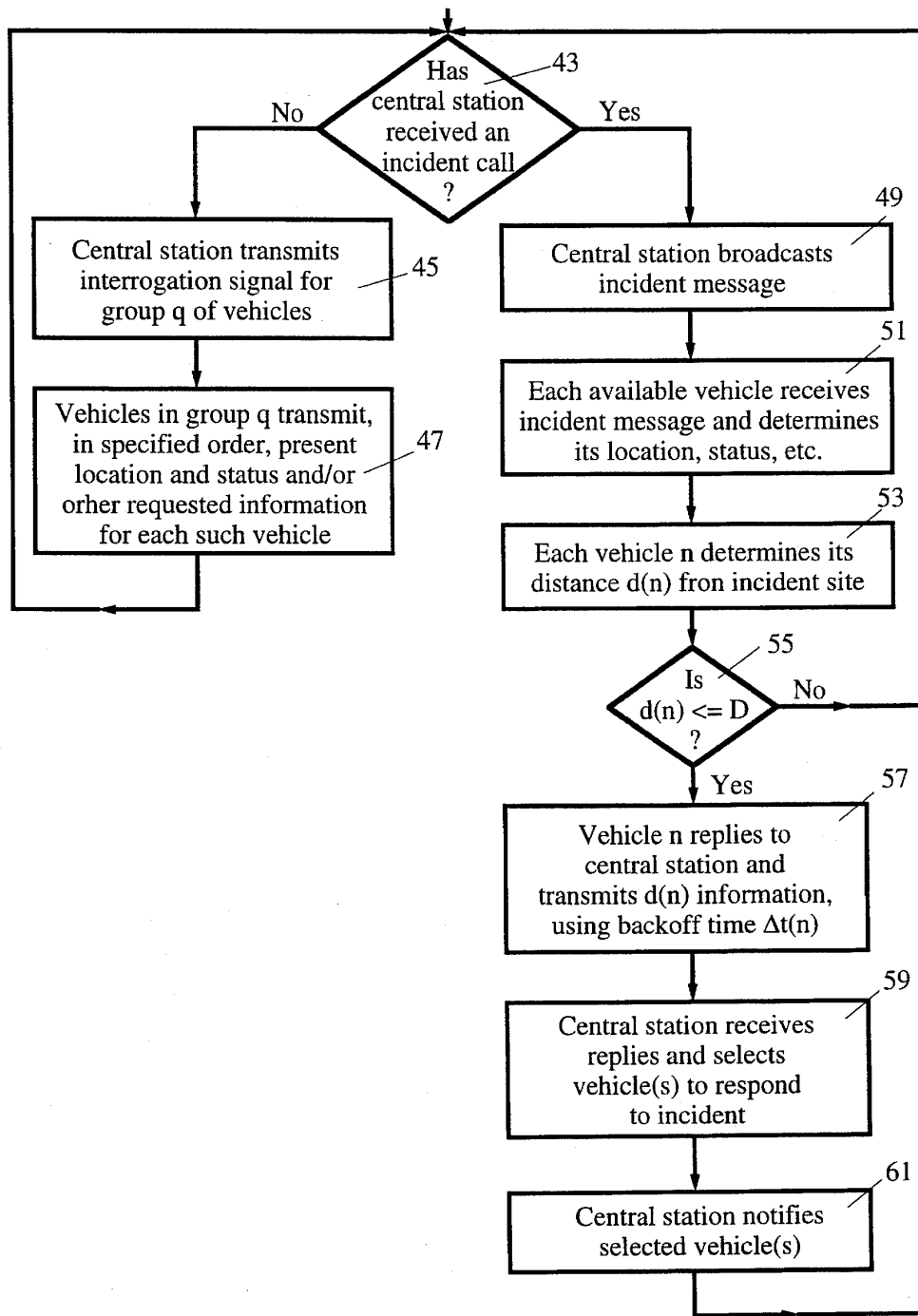
34 Claims, 4 Drawing Sheets

FIG. 1

FIG. 2

FIG. 4

```
                          ┌──────────────┐
                          │     Has    ──43
                    No    │central station│   Yes
              ┌───────────│  received an  │───────────┐
              │           │ incident call │           │
              │           │       ?       │           │
              ▼           └──────────────┘           ▼
   ┌─────────────────────┐                ┌─────────────────────┐
   │ Central station     │                │ Central station     │──49
   │ transmits           │──45            │ broadcasts          │
   │ interrogation signal│                │ incident message    │
   │ for group q of      │                └─────────────────────┘
   │ vehicles            │                           │
   └─────────────────────┘                           ▼
              │                           ┌─────────────────────┐
              ▼                           │ Each available      │──51
   ┌─────────────────────┐                │ vehicle receives    │
   │ Vehicles in group q │                │ incident message and│
   │ transmit, in        │                │ determines its      │
   │ specified order,    │──47            │ location, status,   │
   │ present location and│                │ etc.                │
   │ status and/or orher │                └─────────────────────┘
   │ requested information│                          │
   │ for each such vehicle│                          ▼
   └─────────────────────┘                ┌─────────────────────┐
              │                           │ Each vehicle n      │──53
              │                           │ determines its      │
              ▼                           │ distance d(n) fron  │
                                          │ incident site       │
                                          └─────────────────────┘
                                                     │
                                                     ▼
                                          ┌──────────────┐
                                          │     Is    ──55
                                          │  d(n) <= D   │── No ──┐
                                          │      ?       │        │
                                          └──────────────┘        │
                                                     │ Yes        │
                                                     ▼            │
                                          ┌─────────────────────┐ │
                                          │ Vehicle n replies to│──57
                                          │ central station and │ │
                                          │ transmits d(n)      │ │
                                          │ information, using  │ │
                                          │ backoff time Δt(n)  │ │
                                          └─────────────────────┘ │
                                                     │            │
                                                     ▼            │
                                          ┌─────────────────────┐ │
                                          │ Central station     │──59
                                          │ receives replies and│ │
                                          │ selects vehicle(s)  │ │
                                          │ to respond to       │ │
                                          │ incident            │ │
                                          └─────────────────────┘ │
                                                     │            │
                                                     ▼            │
                                          ┌─────────────────────┐ │
                                          │ Central station     │──61
                                          │ notifies selected   │ │
                                          │ vehicle(s)          │ │
                                          └─────────────────────┘ │
```

FIG. 3

FIG. 5

FIG. 6

DOCKET ALARM
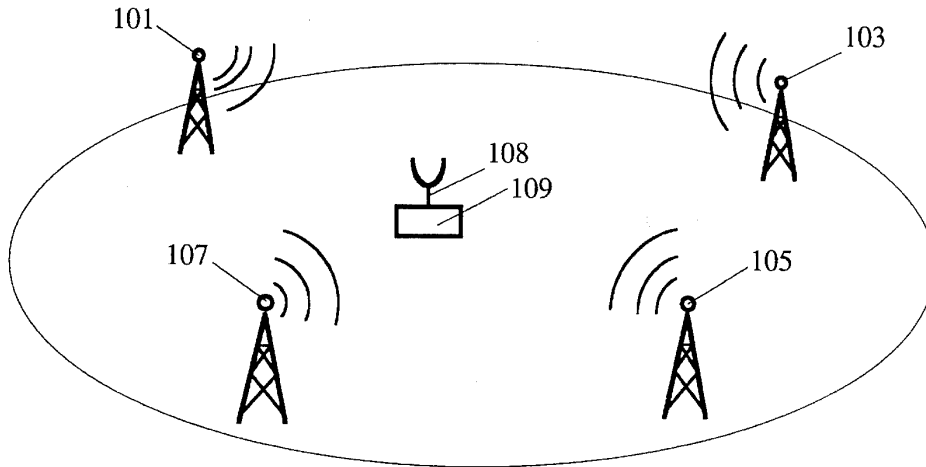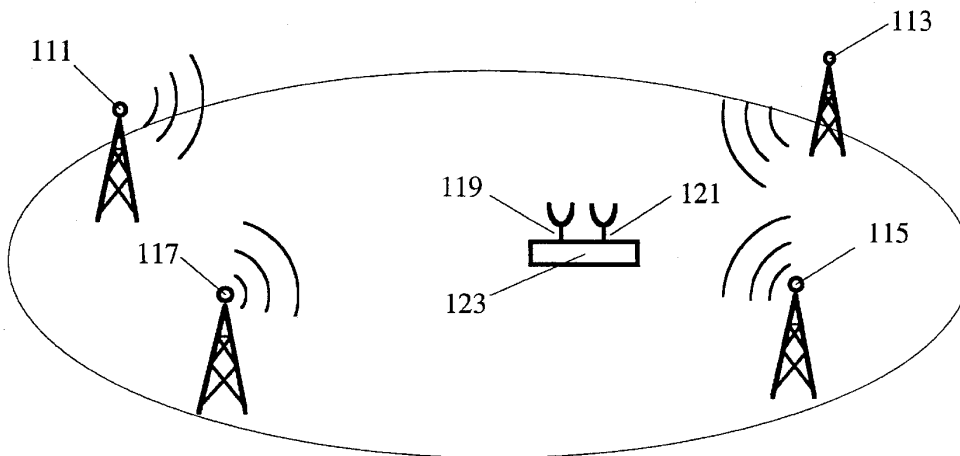
Explore Litigation Insights

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.

fastcase®
Smarter legal research.