



US006401027B1

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

(10) **Patent No.:** **US 6,401,027 B1**  
(45) **Date of Patent:** **Jun. 4, 2002**

- (54) **REMOTE ROAD TRAFFIC DATA COLLECTION AND INTELLIGENT VEHICLE HIGHWAY SYSTEM**
- (75) Inventors: **Yiwen Xu; Youchun Jin**, both of Nepean (CA)
- (73) Assignee: **Wenking Corp.**, St. Lambert (CA)
- (\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

5,610,821 A	*	3/1997	Gazis et al.	364/444.2
5,635,924 A	*	6/1997	Tran et al.	340/905
5,801,943 A	*	9/1998	Nasburg	364/436
5,812,069 A	*	9/1998	Albrecht et al.	340/905
5,822,712 A	*	10/1998	Olsson	701/117
5,835,881 A	*	11/1998	Trovato et al.	701/211
5,862,510 A	*	1/1999	Saga et al.	701/211
5,889,477 A	*	3/1999	Fastenrath	340/905
5,908,464 A	*	6/1999	Kishigami et al.	701/208
6,023,655 A	*	2/2000	Nomura	701/208
6,047,234 A	*	4/2000	Cherveney et al.	701/200
6,072,409 A	*	6/2000	Fushimi et al.	340/988
6,098,015 A	*	8/2000	Nimura et al.	701/209

- (21) Appl. No.: **09/317,127**
- (22) Filed: **May 24, 1999**
- (30) **Foreign Application Priority Data**  
Mar. 19, 1999 (CA) ..... 2266208
- (51) **Int. Cl.**<sup>7</sup> ..... **G06F 163/00**; G06F 165/00; G08G 1/09
- (52) **U.S. Cl.** ..... **701/117**; 701/207; 701/208; 340/988
- (58) **Field of Search** ..... 701/117, 209, 701/201, 200, 207, 208, 212, 214, 118, 119; 340/988, 990, 995, 905

\* cited by examiner

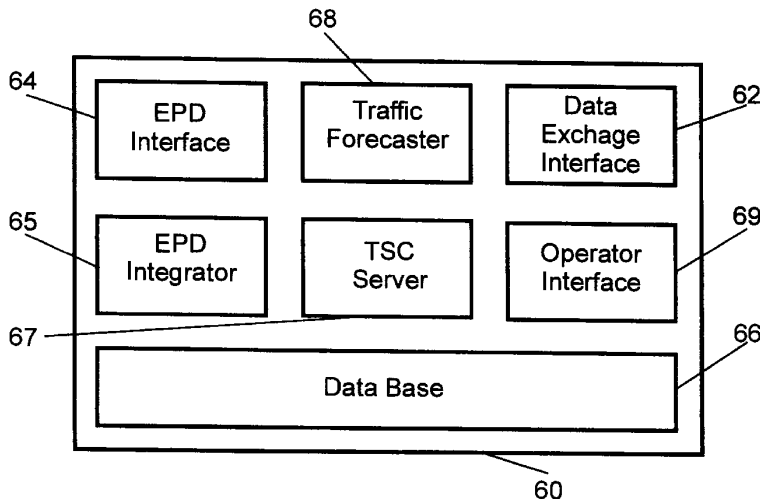
*Primary Examiner*—Tan Nguyen  
*Assistant Examiner*—Dalena Tran  
(74) *Attorney, Agent, or Firm*—Wayne M. Yan; Max R. Wood

**ABSTRACT**

(57) A remote traffic data acquisition and intelligent vehicle highway system for highway vehicles is provided. In-vehicle devices compute time-related vehicle locations on a digitized road network map using information received from a global position system (GPS) and transmit the time-related vehicle locations to a traffic service center. The traffic service center collects the data from all equipped vehicles that travel the roadway system in an area within range, processes the data and provide a real-time traffic forecasts. The in-vehicle devices receive the digitized road network map as well as the real-time traffic forecasts and provide route guidance and related services for the drivers using the traffic forecast information. The traffic forecast is based on projections from normal traffic conditions retrieved from archived data adjusted by factors related to real-time situations. The system provides a practical and economic solution for an intelligent highway vehicle system.

- (56) **References Cited**  
U.S. PATENT DOCUMENTS
- 4,792,803 A \* 12/1988 Madnick et al. .... 340/905
- 5,132,684 A \* 7/1992 Pecker et al. .... 340/905
- 5,164,904 A \* 11/1992 Sumner ..... 364/436
- 5,347,456 A 9/1994 Zhang et al. .... 364/424.02
- 5,396,429 A \* 3/1995 Hanchett ..... 364/436
- 5,504,482 A 4/1996 Schreder ..... 340/995
- 5,506,587 A \* 4/1996 Lans ..... 342/357
- 5,539,645 A \* 7/1996 Mandhyan et al. .... 364/438
- 5,546,188 A 8/1996 Wangler et al. .... 356/376

**33 Claims, 6 Drawing Sheets**



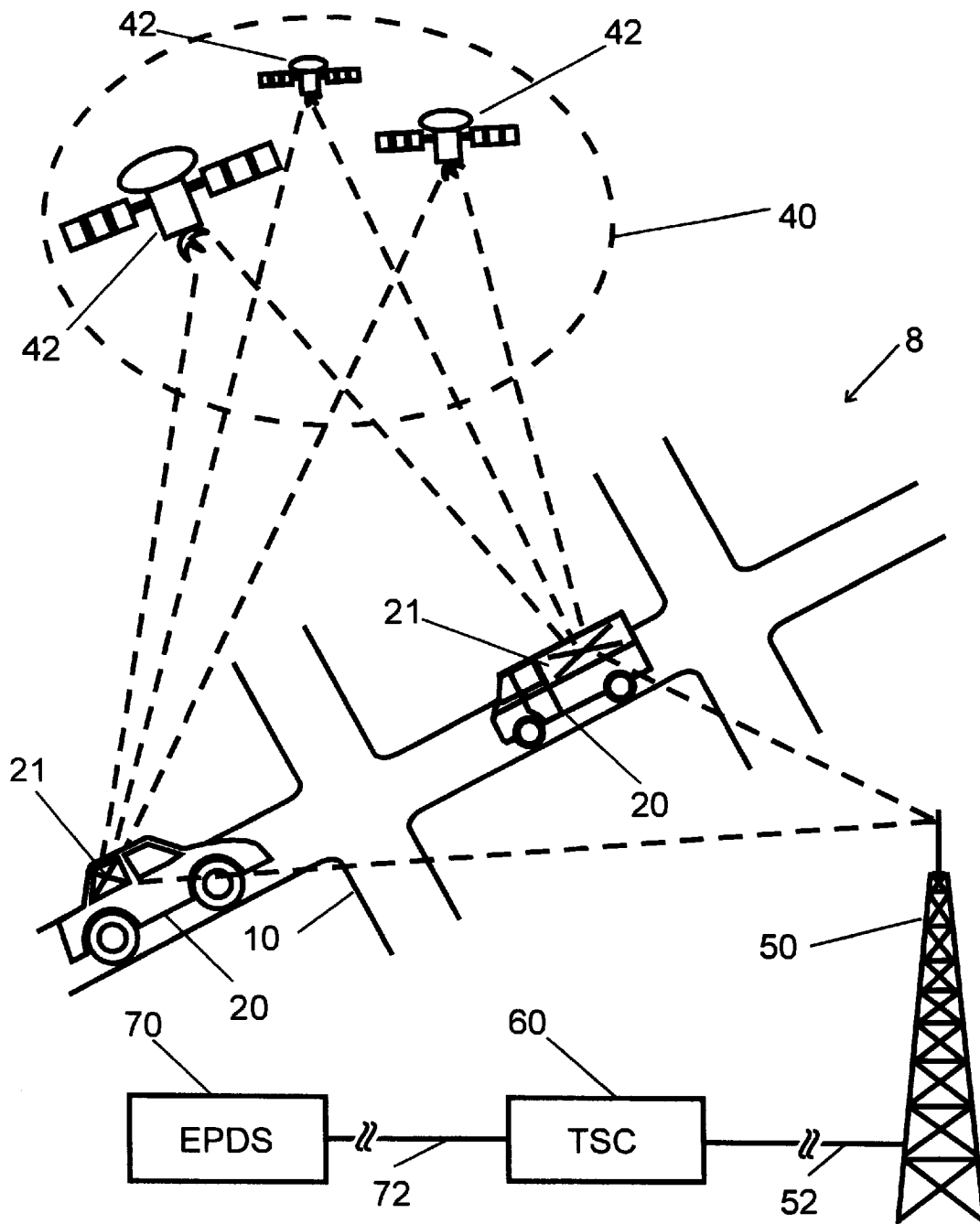


Figure 1

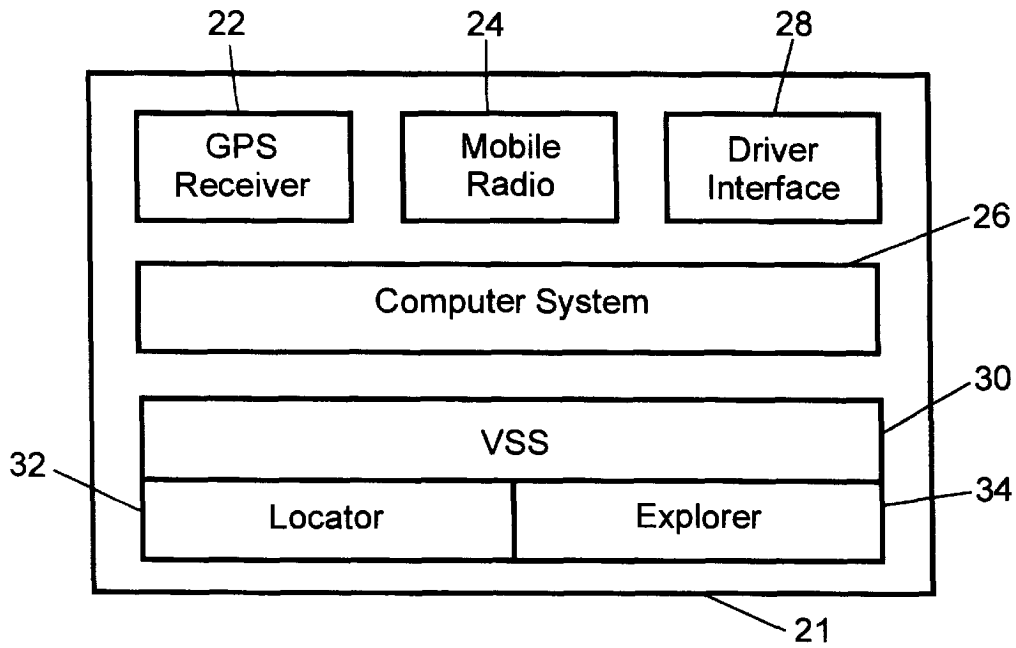


Figure 2

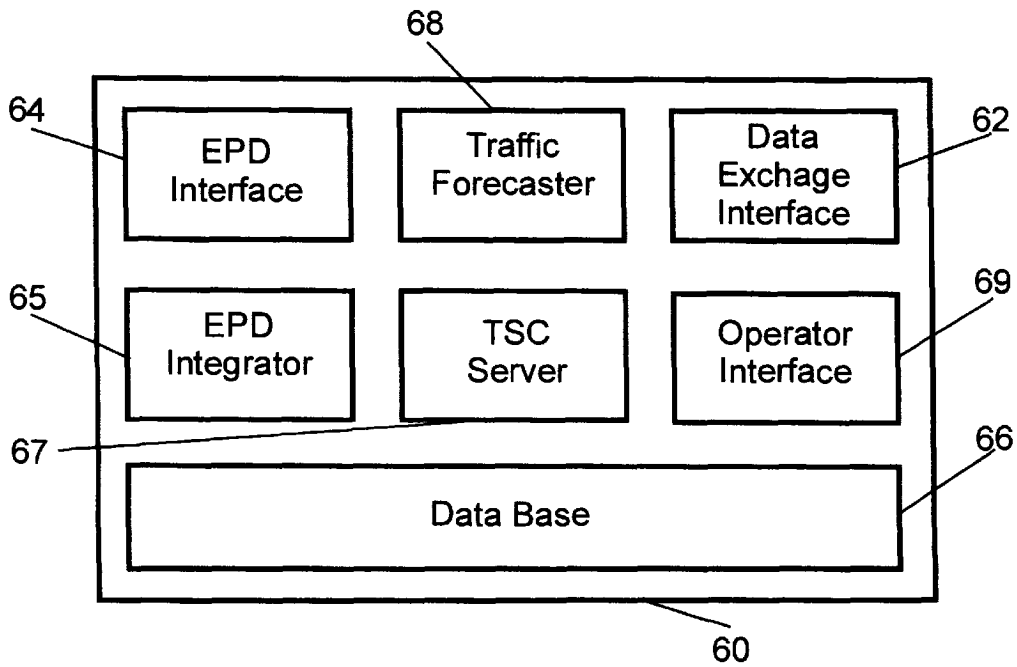


Figure 3

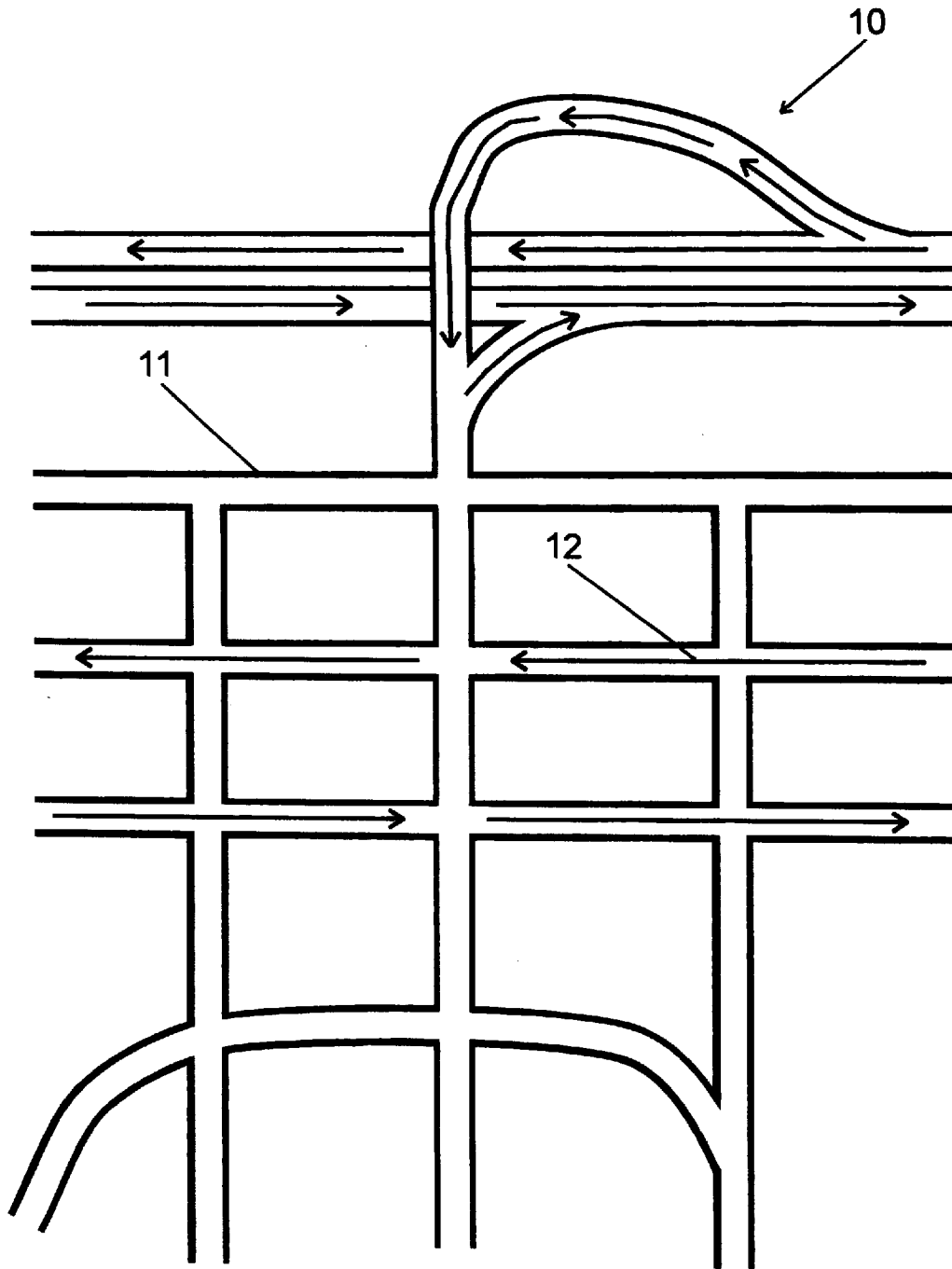


Figure 4

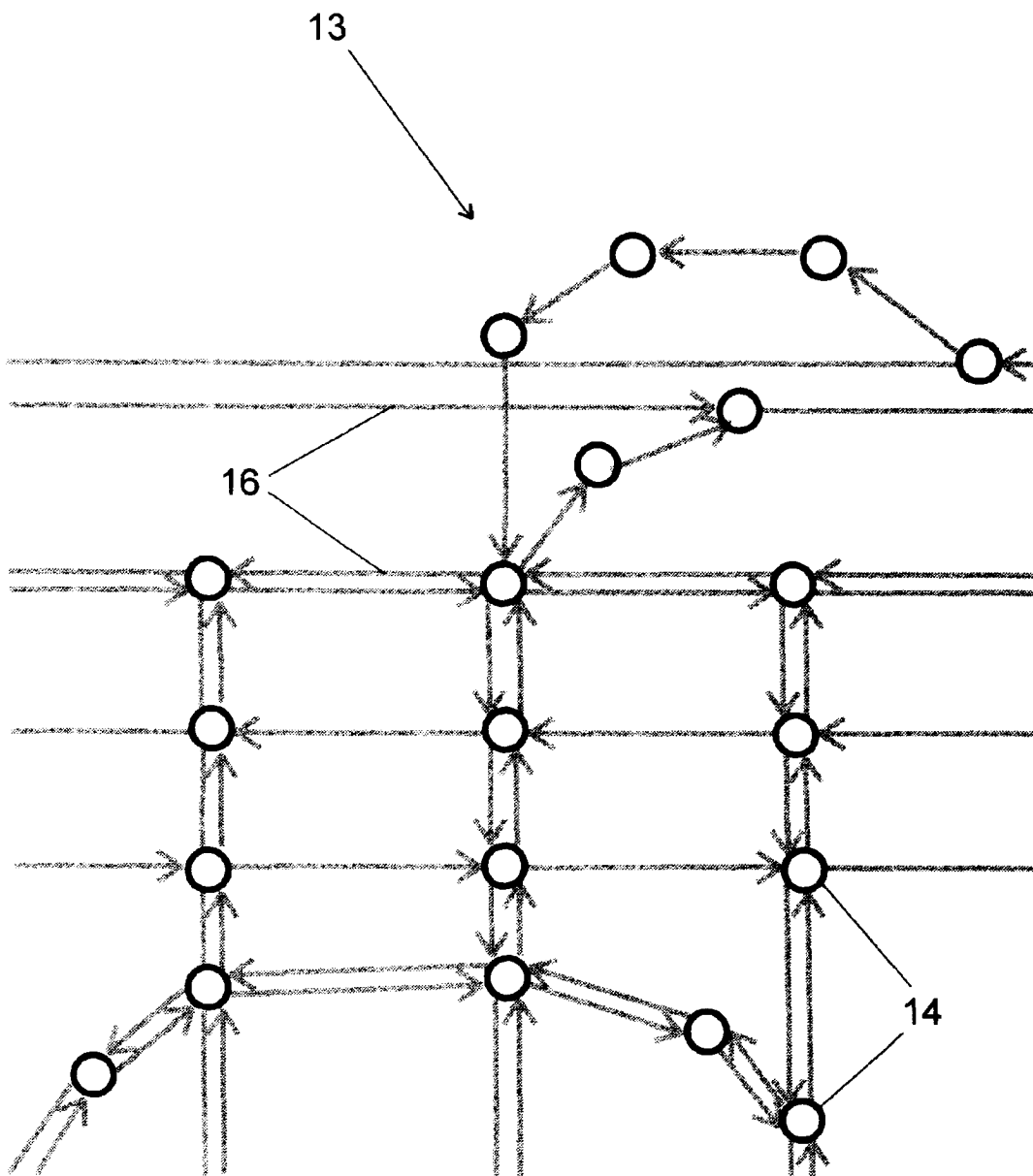


Figure 5

# 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.