Andrew P. Gordon (NV Bar No. 3421)
Jeffrey A. Silvestri (NV Bar No. 5779)
MCDONALD CARANO WILSON LLP
2300 West Sahara Avenue
Suite 1000
Las Vegas, NV 89102
Phone: (702) 873-4100
Facsimile: (702) 873-9966

Brenton R. Babcock (admitted *pro hac vice*)
KNOBBE, MARTENS, OLSON & BEAR, LLP
2040 Main Street
Fourteenth Floor
Irvine, CA 92614
Phone: (949) 760-0404
Facsimile: (949) 760-9502

Frederick S. Berretta (admitted *pro hac vice*)
Phillip Bennett (admitted *pro hac vice*)
KNOBBE, MARTENS, OLSON & BEAR, LLP
12790 El Camino Real
San Diego, CA 92130
Phone: (858) 707-4000
Facsimile: (858) 707-4001

Attorneys for Plaintiff/Counter-Defendant
SILVER STATE INTELLECTUAL TECHNOLOGIES, INC.

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEVADA

SILVER STATE INTELLECTUAL TECHNOLOGIES, INC., a Nevada corporation, Plaintiff/Counter-Defendant, v. TOMTOM, INC., a Massachusetts corporation, Defendant/Counterclaimant.	Case No. 2:11cv1581 PMP-PAL **FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT** **JURY DEMANDED**

AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff SILVER STATE INTELLECTUAL TECHNOLOGIES, INC., by and through its undersigned attorneys, hereby complains of Defendant TOMTOM, INC. for infringement of the United States Patents identified herein, and alleges as follows:

JURISDICTION AND VENUE

1. This is an action for patent infringement arising under the patent laws of the United States, Title 35, United States Code, and more particularly 35 U.S.C. §§ 271 and 281.

2. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

3. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b) and (c), and 1400(b).

THE PARTIES

4. Plaintiff SILVER STATE INTELLECTUAL TECHNOLOGIES, INC. (hereinafter, "SILVER STATE") is a Nevada corporation with its principal place of business at 9811 Charleston Blvd., #2-787, Las Vegas, Nevada 89117.

5. SILVER STATE is the owner by assignment of United States Patent No. 6,529,824, entitled PERSONAL COMMUNICATION SYSTEM FOR COMMUNICATING VOICE DATA POSITIONING INFORMATION, duly and lawfully issued on March 4, 2003 ("the '824 patent"), attached hereto as Exhibit A; United States Patent No. 6,868,335, entitled PERSONAL COMMUNICATION SYSTEM FOR COMMUNICATING VOICE DATA POSITIONING INFORMATION, duly and lawfully issued on March 15, 2005 ("the '335 patent"), attached hereto as Exhibit B; United States Patent No. 7,343,165, entitled GPS PUBLICATION APPLICATION SERVER, duly and lawfully issued on March 11, 2008 ("the '165 patent"), attached hereto as Exhibit C; United States Patent No. 7,522,992, entitled TECHNIQUE FOR EFFECTIVE NAVIGATION BASED ON USER PREFERENCES, duly and lawfully issued on April 21, 2009 ("the '992 patent"), attached hereto as Exhibit D; United States Patent No. 7,593,812, entitled TECHNIQUE FOR EFFECTIVE NAVIGATION BASED ON USER PREFERENCES, duly and lawfully issued on September 22, 2009 ("the

'3812 patent"), attached hereto as Exhibit E; United States Patent No. 7,650,234, entitled TECHNIQUE FOR EFFECTIVE NAVIGATION BASED ON USER PREFERENCES, duly and lawfully issued on January 19, 2010 ("the '234 patent"), attached hereto as Exhibit F; United States Patent No. 7,739,039, entitled TECHNIQUE FOR EFFECTIVE NAVIGATION BASED ON USER PREFERENCES, duly and lawfully issued on June 15, 2010 ("the '039 patent"), attached hereto as Exhibit G; and United States Patent No. 7,702,455, entitled PERSONAL COMMUNICATION SYSTEM TO SEND AND RECEIVE VOICE DATA POSITIONING INFORMATION, duly and lawfully issued on April 20, 2010 ("the '455 patent"), attached hereto as Exhibit H; among other patents and pending patent applications.

6. Upon information and belief, Defendant TOMTOM, INC. (hereinafter, "TOMTOM") is a Massachusetts corporation with its principal place of business at 150 Baker Avenue, Extension, Concord, Massachusetts 01742.

7. Upon information and belief, TOMTOM imports, distributes, offers to sell, and sells in the United States certain navigation devices that SILVER STATE alleges infringes the '824 patent, the '335 patent, the '165 patent, the '992 patent, the '3812 patent, the '234 patent, the '039 patent, and the '455 patent, as alleged further herein below. SILVER STATE reserves the right to amend its Complaint to include additional patents owned by SILVER STATE based on the results of discovery in this matter.

8. Upon information and belief, TOMTOM does business in this judicial district and has committed acts of infringement in this judicial district.

FIRST CLAIM FOR RELIEF - INFRINGEMENT OF THE '824 PATENT

9. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

10. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '824 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claim 8 of the '824 patent by TOMTOM's

LIVE services that provide real-time local content to TOMTOM's LIVE-capable navigation devices such as the GO 740 LIVE navigation device that receives a specified maximum number of listings in response to a search request, and other TOMTOM navigation services and devices that function similarly.

11. Upon information and belief, discovery will reveal additional infringement of the '824 patent by TOMTOM, including infringement of additional claims of the '824 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

12. As a direct and proximate result of TOMTOM's infringement of the '824 patent, SILVER STATE has been and continues to be damaged.

13. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '824 patent unless enjoined by this Court.

SECOND CLAIM FOR RELIEF - INFRINGEMENT OF THE '335 PATENT

14. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

15. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '335 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claim 1 of the '335 patent by TOMTOM's LIVE services that provide real-time local content to TOMTOM's LIVE-capable navigation devices such as the GO 740 LIVE and GO 2535 LIVE navigation devices that receive data associated with specific locations and display markers at the specific locations that may be selected to obtain additional information associated with a specific location, and request additional data associated with the specific location, and other TOMTOM navigation devices that function similarly.

/ / /

16. Upon information and belief, discovery will reveal additional infringement of the '335 patent by TOMTOM, including infringement of additional claims of the '335 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

17. As a direct and proximate result of TOMTOM's infringement of the '335 patent, SILVER STATE has been and continues to be damaged.

18. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '335 patent unless enjoined by this Court.

THIRD CLAIM FOR RELIEF - INFRINGEMENT OF THE '165 PATENT

19. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

20. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '165 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claims 1 and 2 of the '165 patent by TOMTOM's LIVE-capable navigation devices such as the GO 740 LIVE navigation device that is capable of running TOMTOM's Buddies social network application, and other TOMTOM navigation devices that function similarly.

21. Upon information and belief, discovery will reveal additional infringement of the '165 patent by TOMTOM, including infringement of additional claims of the '165 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

22. As a direct and proximate result of TOMTOM's infringement of the '165 patent, SILVER STATE has been and continues to be damaged.

/ / /

23. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '165 patent unless enjoined by this Court.

FOURTH CLAIM FOR RELIEF - INFRINGEMENT OF THE '992 PATENT

24. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

25. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '992 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claim 23 of the '992 patent by TOMTOM's GO, VIA and XXL series navigation devices that display the location of the device and one or more goods or service providers on a map in the vicinity of the device based on user preference, including one or more indicators on the map selectable to obtain data concerning the one or more goods or service providers, and other TOMTOM navigation devices that function similarly.

26. Upon information and belief, discovery will reveal additional infringement of the '992 patent by TOMTOM, including infringement of additional claims of the '992 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

27. As a direct and proximate result of TOMTOM's infringement of the '992 patent, SILVER STATE has been and continues to be damaged.

28. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '992 patent unless enjoined by this Court.

FIFTH CLAIM FOR RELIEF - INFRINGEMENT OF THE '3812 PATENT

29. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

/ / /

30. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '3812 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claim 10 of the '3812 patent by TOMTOM's GO and VIA series navigation devices that include storage for records associated with points of interest, a processor and a display for presenting points of interest based on user preference and allowing the user to select a point of interest and for retrieving connection data such as a telephone number for the point of interest, and further providing a user entry to establish a communications connection to the selected point of interest, and other TOMTOM navigation devices that function similarly.

31. Upon information and belief, discovery will reveal additional infringement of the '812b patent by TOMTOM, including infringement of additional claims of the '3812 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

32. As a direct and proximate result of TOMTOM's infringement of the '3812 patent, SILVER STATE has been and continues to be damaged.

33. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '3812 patent unless enjoined by this Court.

SIXTH CLAIM FOR RELIEF - INFRINGEMENT OF THE '234 PATENT

34. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

35. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '234 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claim 17 of the '234 patent by TOMTOM's GO,

VIA and XXL series navigation devices that include traffic information data, such as TOMTOM's IQ Routes data, and a processor capable of using the traffic information data to plan a route in an area other than the present location of the navigation device, and other TOMTOM navigation devices that function similarly.

36. Upon information and belief, discovery will reveal additional infringement of the '234 patent by TOMTOM, including infringement of additional claims of the '234 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

37. As a direct and proximate result of TOMTOM's infringement of the '234 patent, SILVER STATE has been and continues to be damaged.

38. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '234 patent unless enjoined by this Court.

SEVENTH CLAIM FOR RELIEF - INFRINGEMENT OF THE '039 PATENT

39. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

40. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '039 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claim 16 of the '039 patent by TOMTOM's GO, VIA and XXL series navigation devices that include memory for storing data concerning preferred points of interest, the capability to allow user input to avoid a geographic area, an interface to receive a request to plan a route, a device for collecting information concerning a condition affecting travel, such as live traffic information, a processor capable of planning a route taking into account the condition affecting travel and the geographic area to be avoided, and a display for displaying the planned route and one or more indicators indicating locations of the preferred points of interest in relation to the planned route, and other TOMTOM

navigation devices that function similarly.

41. Upon information and belief, discovery will reveal additional infringement of the '039 patent by TOMTOM, including infringement of additional claims of the '039 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

42. As a direct and proximate result of TOMTOM's infringement of the '039 patent, SILVER STATE has been and continues to be damaged.

43. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '039 patent unless enjoined by this Court.

EIGHTH CLAIM FOR RELIEF - INFRINGEMENT OF THE '455 PATENT

44. SILVER STATE realleges and incorporates herein by reference the allegations stated in paragraphs 1-8 of this Complaint.

45. Upon information and belief, in violation of one or more provisions of 35 U.S.C. § 271, TOMTOM has directly and indirectly infringed and is continuing to directly and indirectly infringe one or more claims of the '455 patent through its importation, distribution, offers to sell, and sales in the United States of certain navigation devices, including without limitation infringement of Claim 1 of the '455 patent by TOMTOM's GO 2000, VIA, and GO LIVE series navigation devices that include live traffic capability and display traffic information obtained from a data provider, and display waypoints selectable by the user that may be reordered to suggest a route to the user, and other TOMTOM navigation devices that function similarly.

46. Upon information and belief, discovery will reveal additional infringement of the '455 patent by TOMTOM, including infringement of additional claims of the '455 patent, and through TOMTOM's importation, distribution, offers to sell, and sales in the United States of additional navigation devices, which additional infringements shall also comprise this claim for relief.

/ / /

47. As a direct and proximate result of TOMTOM's infringement of the '455 patent, SILVER STATE has been and continues to be damaged.

48. SILVER STATE has been and will continue to be irreparably harmed by TOMTOM's infringement of the '455 patent unless enjoined by this Court.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff SILVER STATE prays for relief as follows:

A. That Defendant TOMTOM be adjudged to have infringed the '824 patent under 35 U.S.C. § 271;

B. That Defendant TOMTOM be adjudged to have infringed the '335 patent under 35 U.S.C. § 271;

C. That Defendant TOMTOM be adjudged to have infringed the '165 patent under 35 U.S.C. § 271;

D. That Defendant TOMTOM be adjudged to have infringed the '992 patent under 35 U.S.C. § 271;

E. That Defendant TOMTOM be adjudged to have infringed the '3812 patent under 35 U.S.C. § 271;

F. That Defendant TOMTOM be adjudged to have infringed the '234 patent under 35 U.S.C. § 271;

G. That Defendant TOMTOM be adjudged to have infringed the '039 patent under 35 U.S.C. § 271;

H. That Defendant TOMTOM be adjudged to have infringed the '455 patent under 35 U.S.C. § 271;

I. That Defendant TOMTOM, its subsidiaries, affiliates, officers, agents, servants, employees and attorneys, and all those persons in active concert or participation with any of them be permanently restrained and enjoined under 35 U.S.C. § 283 from directly and indirectly infringing the '824 patent, the '335 patent, the '165 patent, the '992 patent, the '3812 patent, the '234 patent, the '039 patent, and the '455 patent;

/ / /

J. That the Court award Plaintiff SILVER STATE recovery of damages to compensate it for TOMTOM's infringement of SILVER STATE's patents as alleged herein, pursuant to 35 U.S.C. § 284;

K. That the Court order TOMTOM to provide an accounting and to pay supplemental damages to SILVER STATE, including without limitation pre-judgment and post-judgment interest, and costs of suit herein pursuant to 35 U.S.C. § 284; and

L. That Plaintiff SILVER STATE have such other and further relief as this Court may deem just and proper.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: May 23, 2012

By: /s/Frederick S. Berretta
Brenton R. Babcock (admitted *pro hac vice)*
Frederick S. Berretta (admitted *pro hac vice)*
Phillip Bennett (admitted *pro hac vice)*

and

MCDONALD CARANO WILSON LLP

Andrew P. Gordon
Jeffrey A. Silvestri

Attorneys for Plaintiff/Counter-Defendant
SILVER STATE INTELLECTUAL
TECHNOLOGIES, INC.

DEMAND FOR TRIAL BY JURY

Plaintiff SILVER STATE hereby demands a trial by jury on all issues so triable.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: May 23, 2012

By: /s/Frederick S. Berretta
Brenton R. Babcock (admitted *pro hac vice)*
Frederick S. Berretta (admitted *pro hac vice)*
Phillip Bennett (admitted *pro hac vice)*

and

MCDONALD CARANO WILSON LLP

Andrew P. Gordon
Jeffrey A. Silvestri

Attorneys for Plaintiff/Counter-Defendant
SILVER STATE INTELLECTUAL
TECHNOLOGIES, INC.

13249461

PROOF OF SERVICE

I hereby certify that on May 23, 2012, I caused the **FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT; JURY DEMANDED** to be electronically filed with the Clerk of the Court using the CM/ECF system which will send electronic notification of such filing to the following person(s):

Karl L. Nielson
kln@jonesvargas.com
Justin J. Bustos
jbustos@jonesvargas.com
JONES VARGAS, LLP
3773 Howard Hughes Parkway,
Third Floor South
Las Vegas, NV 89169
Phone: (702) 862-3300

James Wallace
jwallace@wileyrein.com
Brian Pandya
bpandya@wileyrein.com
WILEY REIN LLP
1776 K Street, NW
Washington DC 20006
Phone: 202-719-7457

I certify and declare under penalty of perjury under the laws of the State of California that I am employed in the office of a member of the bar of this Court at whose direction the service was made, and that the forgoing is true and correct.

Executed on May 23, 2012, at San Diego, California.

Megan Ptacin

13249615

TABLE OF EXHIBITS

EXHIBIT A

US006529824B1

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

(10) **Patent No.: US 6,529,824 B1**
(45) **Date of Patent: *Mar. 4, 2003**

(54) **PERSONAL COMMUNICATION SYSTEM FOR COMMUNICATING VOICE DATA POSITIONING INFORMATION**

(75) Inventors: **Michael L. Obradovich**, San Clemente; **John Dinkel**, Irvine; **Michael Kent**, Garden Grove, all of CA (US)

(73) Assignee: **American Calcar, Inc.**, Wilmington, DE (US)

(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/669,527**

(22) Filed: **Sep. 25, 2000**

Related U.S. Application Data

(62) Division of application No. 08/879,955, filed on Jun. 20, 1997, now Pat. No. 6,148,261.

(51) **Int. Cl.**[7] **G06F 7/00**

(52) **U.S. Cl.** **701/208**; 340/995; 342/357.1; 342/457; 455/456; 455/461

(58) **Field of Search** 701/207, 208, 701/209, 213, 300; 340/944, 945, 961, 971, 979, 988, 989, 990, 995, 286.01, 286.06; 342/352, 357.1, 457; 455/433, 437, 438, 439, 440, 459, 461, 456, 457

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,350,970	A	9/1982	von Tomkewitsch	
4,521,857	A	6/1985	Reynolds, III	
4,792,803	A	12/1988	Madnick et al.	
4,812,843	A	3/1989	Champion et al.	340/905
4,977,509	A	12/1990	Pitchford et al.	701/200
5,023,934	A	6/1991	Wheeless	
5,043,736	A	8/1991	Darnell et al.	342/357
5,119,504	A	6/1992	Durboraw, III	455/54.1
5,124,915	A	6/1992	Krensel	364/420
5,127,674	A	7/1992	Lamphere et al.	
5,164,904	A	11/1992	Summer	
5,189,632	A	2/1993	Paajanen et al.	
5,225,843	A	7/1993	Thompson	
5,235,633	A	8/1993	Dennison et al.	379/60
5,265,024	A	11/1993	Crabill et al.	

(List continued on next page.)

OTHER PUBLICATIONS

Geosystems, Home and Corporate web pages, 4 pages.
Geosystems, Products and MapRoom web pages, Products & Services, 23 pages.
Geosystems, Corporate web pages, Corporate Backgrounder, 14 pages.
WorldPages web pages, 5 pages.
DineNet web pages, 19 pages.
AAA Map'n 'Go Travel Package web pages, 7 pages.
Nokia 9000 Communicator web pages, 16 pages.

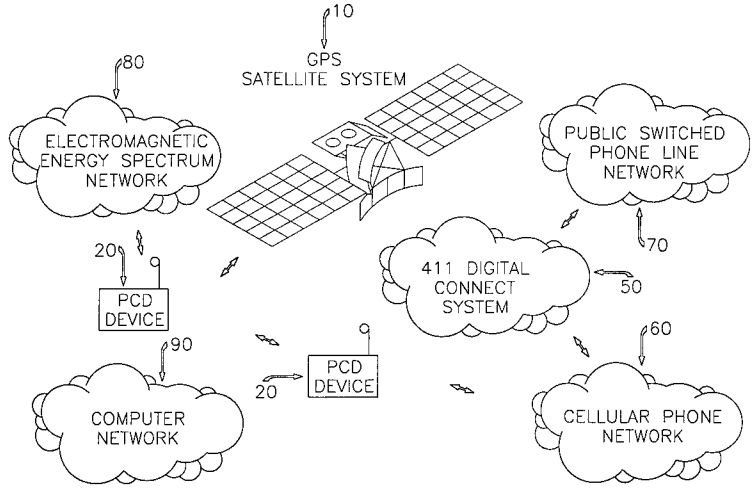
(List continued on next page.)

Primary Examiner—William A. Cuchlinski, Jr.
Assistant Examiner—Ed Pipala
(74) *Attorney, Agent, or Firm*—Christie, Parker & Hale, LLP

(57) **ABSTRACT**

A location tagged data provision and display system. A personal communication device (PCD) with electromagnetic communication capability has a GPS receiver and a display. The PCD requests maps and location tagged data from data providers and other for display on the PCD. The data providers respond to requests by using searching and sorting schemes to interrogate data bases and then automatically transmitting data responsive to the requests to the requesting PCD.

15 Claims, 31 Drawing Sheets



U.S. PATENT DOCUMENTS

5,267,042	A	11/1993	Tsuchiya et al.	
5,272,638	A	12/1993	Martin et al.	
5,295,064	A	3/1994	Malec et al.	
5,299,132	A	3/1994	Wortham	364/460
5,334,974	A	8/1994	Simms et al.	340/990
5,335,276	A	8/1994	Thompson et al.	380/21
5,420,592	A	5/1995	Johnson	
5,432,841	A	7/1995	Rimer	
5,450,329	A	9/1995	Tanner	364/449
5,479,351	A	12/1995	Woo et al.	
5,479,482	A	12/1995	Grimes	379/59
5,497,339	A	3/1996	Bernard	364/705.5
5,504,482	A	4/1996	Schreder, III	340/995
5,504,684	A	4/1996	Lau et al.	
5,517,193	A	5/1996	Allison et al.	
5,519,403	A	5/1996	Bickley et al.	342/352
5,523,950	A	6/1996	Peterson	
5,528,248	A	6/1996	Steiner et al.	342/357
5,528,493	A	6/1996	Potter	
5,539,645	A	7/1996	Mandhyan et al.	
5,543,789	A	8/1996	Behr et al.	340/995
5,555,286	A	9/1996	Tendler	
5,555,386	A	9/1996	Tendler	379/59
5,559,520	A	9/1996	Barzegar et al.	342/357
5,572,204	A	11/1996	Timm et al.	340/988
5,579,535	A	11/1996	Orden et al.	455/33.1
5,600,796	A	2/1997	Okamura et al.	
5,604,676	A	2/1997	Penzias	
5,625,668	A	4/1997	Loomis et al.	379/58
5,625,884	A	4/1997	Gitlin et al.	
5,627,547	A	5/1997	Ramaswamy et al.	342/357
5,627,549	A	5/1997	Park	
5,630,068	A	5/1997	Vela et al.	
5,638,279	A	6/1997	Kishi et al.	
5,640,156	A	6/1997	Okuda et al.	
5,642,285	A	6/1997	Woo et al.	
5,648,763	A	7/1997	Long	
5,648,769	A	7/1997	Sato et al.	340/988
5,652,379	A	7/1997	Fukatani	
5,654,886	A	8/1997	Zereski, Jr. et al.	
5,661,652	A	8/1997	Sprague et al.	364/449.7
5,663,548	A	9/1997	Hayashi et al.	
5,673,039	A	9/1997	Pietzsch et al.	
5,675,732	A	10/1997	Majeti et al.	
5,677,837	A	10/1997	Reynolds	364/424.028
5,680,444	A	10/1997	Reeves	
5,689,252	A	11/1997	Ayonoglu et al.	340/991
5,694,514	A	12/1997	Evans et al.	
5,699,056	A	12/1997	Yoshida	340/905
5,699,255	A	12/1997	Ellis et al.	701/212
5,719,936	A	2/1998	Hillenmayer	
5,727,053	A	3/1998	Sizer, II et al.	
5,731,997	A	3/1998	Manson et al.	
5,742,509	A	4/1998	Goldberg et al.	
5,745,855	A	4/1998	Futamura	
5,748,106	A	5/1998	Schoenian et al.	
5,760,742	A	6/1998	Branch et al.	342/457
5,774,070	A	6/1998	Rendon	340/905
5,774,825	A	6/1998	Reynolds	
5,774,827	A	6/1998	Smith et al.	701/209
5,781,150	A	7/1998	Norris	
5,786,789	A	7/1998	Janky	
5,790,974	A	8/1998	Tognazzini	702/204
5,794,174	A	8/1998	Janky et al.	
5,802,492	A	9/1998	DeLorme et al.	
5,809,247	A	9/1998	Richardson et al.	
5,815,683	A	9/1998	Vogler	
5,819,227	A	10/1998	Obuchi	
5,864,305	A	1/1999	Rosenquist	340/905
5,908,464	A	6/1999	Kishigami et al.	701/208
5,917,405	A	6/1999	Joao	
5,919,246	A	7/1999	Waizmann et al.	701/209
5,929,774	A	7/1999	Charlton	
5,938,721	A	8/1999	Dussell et al.	
5,946,626	A	8/1999	Foladare et al.	
5,948,040	A *	9/1999	DeLorme et al.	701/201
5,950,173	A	9/1999	Perkowski	
5,963,956	A	10/1999	Smartt	707/104
5,982,298	A	11/1999	Lappenbusch et al.	340/905
5,999,124	A	12/1999	Sheynblat	
5,999,877	A	12/1999	Takahashi et al.	71/117
6,028,550	A	2/2000	Froeberg et al.	
6,047,327	A	4/2000	Tso et al.	
6,075,874	A	6/2000	Higashikubo et al.	
6,087,965	A	7/2000	Murphy	
6,092,076	A	7/2000	McDonough et al.	707/102
6,107,944	A	8/2000	Behr et al.	340/995
6,119,066	A	9/2000	Sugiura et al.	701/208
6,122,506	A	9/2000	Lau et al.	
6,124,825	A	9/2000	Eschenbach	
6,127,945	A	10/2000	Mura-Smith	
6,131,066	A	10/2000	Ahrens et al.	701/200
6,131,067	A	10/2000	Girerd et al.	
6,134,501	A	10/2000	Oumi	701/209
6,144,920	A	11/2000	Mikame	701/212
6,147,598	A	11/2000	Murphy et al.	
6,148,261	A	11/2000	Obradovich et al.	701/208
6,163,749	A	12/2000	McDonough et al.	701/208
6,163,753	A	12/2000	Beckmann et al.	
6,166,626	A	12/2000	Janky et al.	
6,169,955	B1	1/2001	Fultz	
6,173,231	B1	1/2001	Chojnacki	701/208
6,184,801	B1	2/2001	Janky	
6,185,427	B1	2/2001	Krasner et al.	455/456
6,188,957	B1	2/2001	Bechtolsheim et al.	701/209
6,192,312	B1	2/2001	Hummelsheim	701/118
6,192,314	B1	2/2001	Khavakh et al.	701/209
6,199,013	B1	3/2001	O'Shea	701/211
6,202,023	B1	3/2001	Hancock et al.	701/201
6,208,934	B1	3/2001	Bechtolsheim et al.	701/209
6,212,392	B1	4/2001	Fitch et al.	455/456
6,212,470	B1	4/2001	Seymour et al.	701/207
6,212,472	B1	4/2001	Nonaka et al.	701/208
6,212,473	B1	4/2001	Stefan et al.	701/210
6,212,550	B1	4/2001	Segur	709/206
6,219,557	B1	4/2001	Havinis	
6,219,614	B1	4/2001	Uchigaki et al.	
6,219,694	B1	4/2001	Lazaridis et al.	709/206
6,321,158	B1	11/2001	DeLorme et al.	
6,332,127	B1	12/2001	Bandera et al.	

OTHER PUBLICATIONS

Global Map 2000 web pages, 6 pages.

Demmler, "Another Car Navagation System," Automotive Engineering, Jun. 1996, pp. 87, 89, 2 pages.

Sedgwick, "Butterfly gives clue to cars of tomorrow", Automotive News, Oct. 28, 1996, p. 43, 2 pages.

Jewett, "Toyota offers navigation system as U.S. option," Automotive News, Nov. 18, 1996, p. 16, 2 pages.

Yamaguchi, "Honda in–car navigation system for the U.S.," Automotive Engineering, Jun. 1996, pp. 82–84, 3 pages.

Heuchert, "Eyes Forward: An ergonomic solution to driver information overload," Automotive Engineering, Sep. 1996, pp. 27–31, 5 pages.

Noriyuki, "Just Think of It as a Big Eye in the Sky . . . Watching," Los Angeles Times, Section E, pp. 1, 8, Apr. 27, 1997, 2 pages.

BigYellow web pages, 6 pages.

Maps On Us web pages, 14 pages.

Maps On Us web pages, Search Categories, 14 pages.
Mapquest web pages, 1 page.
Advertisement, "Collision Avoidance is Critical . . . Now it's Affordable," 1 page.
Advertisement, "Duats," 1 page.
"Trimble Demonstrates Trimconnect," Flying, Jul. 1997, p. 51, 1 page.
Advertisement, "MFD 5200 Multi–Function Display," 1 page.
Advertisement, "SUPER Road Whiz", 2 pages.
Yoshikazu Noguchi, "Intelligent Car—History and the Future in Japan and Toyota," Toyota Motor Corporation 98C015, 5 pages.
Monet (Mobile Network), 2 pages.
Steve Dye with Dr. Frank Baylin, The GPS Manual Principles and Applications, "Land Navigation Market—Overview", Feb. 1997, ISBN:0–917893–29–8, 23 pages.
Martin Wolk, "Microsoft unveils plans for car dashboard computer," Reuters Article, Copyright date 1998.
Edward W. Desmond, "Malone Again," Fortune Cover Stories, Publication Date Feb. 16, 1998, pp. 66, 68 & 69.
Alcatel web pages, Alcatel, Nov. 24, 1998 (58 pages).
Giga Information Group, Inc. web pages, Giga Information Group, Inc. Nov. 24, 1998 (4 pages).
Spyglass web pages, Spyglass, Nov. 24, 1998 (58 pages).
Think Thin, PC Magazine, Dec. 01, 1998 (p. 9).
McDonald, Keith D., "Course 122 –GPS Fundamentals & Applications", Navtech Seminars & GPS Supply, Inc., Catamaran Resort Hotel, San Diego, CA, Mar. 22–23, 1999 (336 sheets).
Kelley, Tom, "Traffic Control Traffic Data, Unplugges", ITS World, Jul./Aug. 2000 (pp. 28–30).
Bishop, Richard, "The Final Stop Remember IVHS?", ITS World, Jul./Aug. 2000 (pp. 14–15).
Metricom in the News, web pages, Metricom, Inc., Nov. 24, 1998 (8 pages).

* cited by examiner

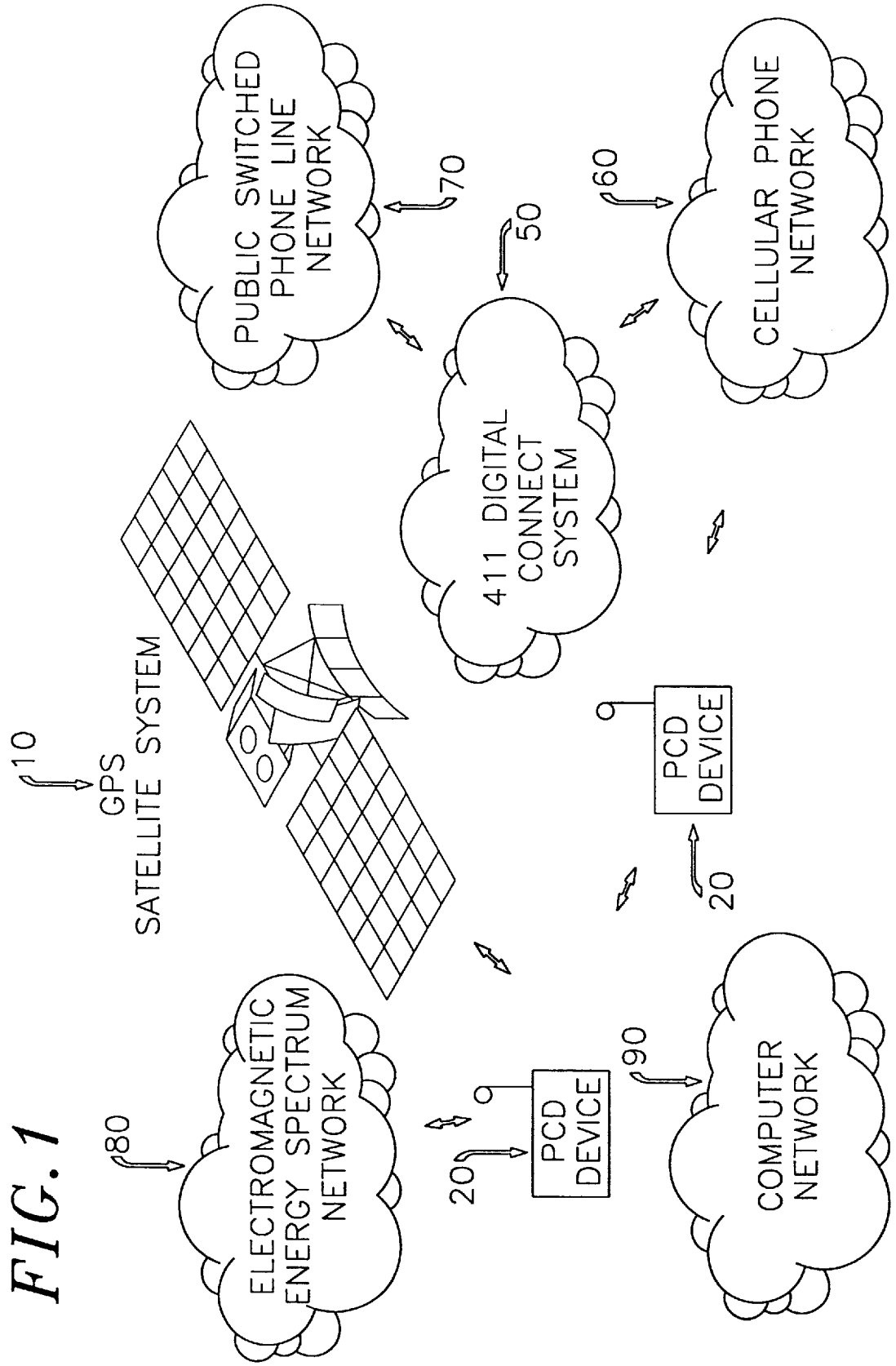

PUBLIC SWITCHED PHONE LINE NETWORK
70
CELLULAR PHONE NETWORK
60
50
411 DIGITAL CONNECT SYSTEM
10
GPS SATELLITE SYSTEM
PCD DEVICE
9
20
ELECTROMAGNETIC ENERGY SPECTRUM NETWORK
80
PCD DEVICE
9
20
COMPUTER NETWORK
90

FIG. 1

FIG.2

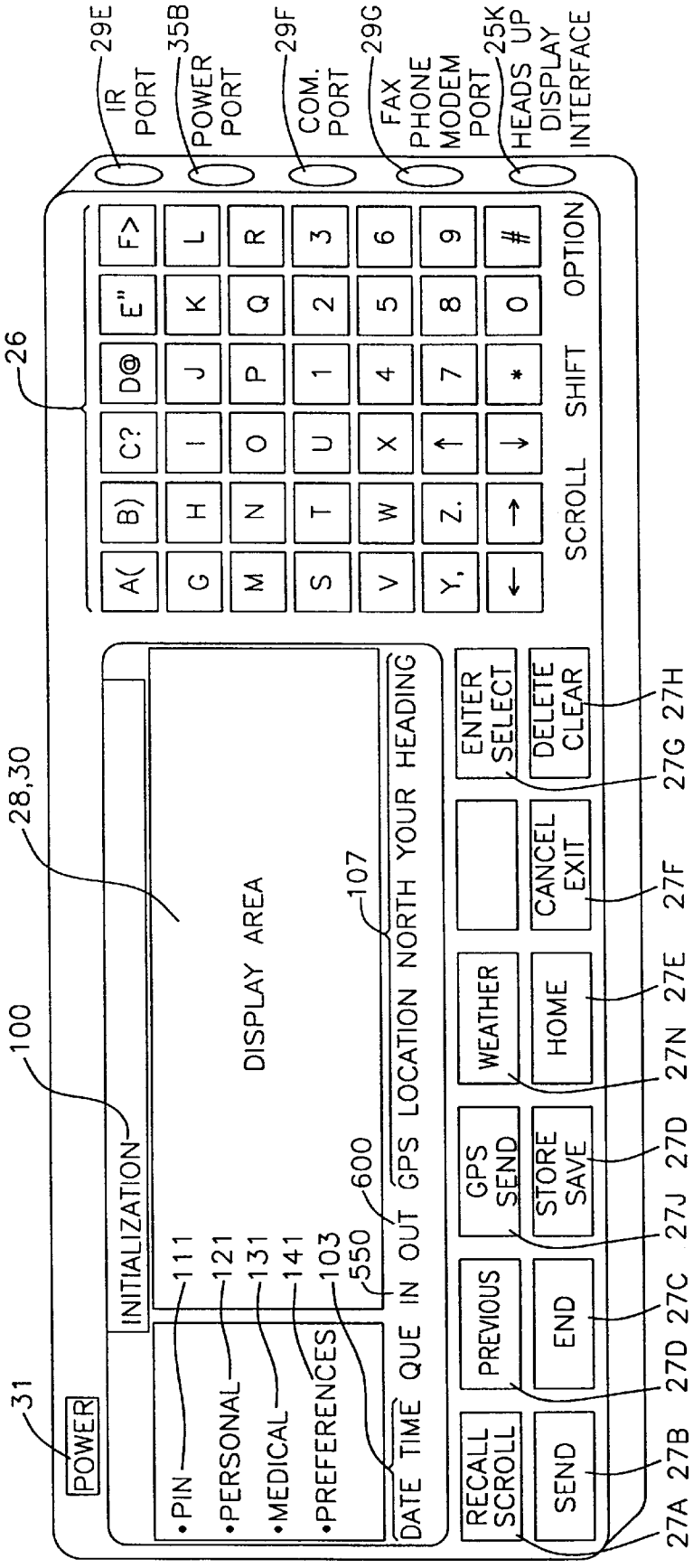

29E
IR PORT
35B
POWER PORT
29F
COM. PORT
29G
FAX PHONE MODEM PORT
25K
HEADS UP DISPLAY INTERFACE
26
A(B) C? D@ E" F>
G H I J K L
M N O P Q R
S T U 1 2 3
V W X 4 5 6
Y, Z. ↑ 7 8 9
← → ↓ * 0 #
SCROLL SHIFT OPTION
28,30
100
INITIALIZATION
DISPLAY AREA
107
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
600
550
111
121
131
141
103
•PIN
•PERSONAL
•MEDICAL
•PREFERENCES
31
POWER
ENTER SELECT
DELETE CLEAR
27G 27H
CANCEL EXIT
27F
WEATHER
HOME
27N 27E
GPS SEND
STORE SAVE
27J 27D
PREVIOUS
END
27D 27C
RECALL SCROLL
SEND
27A 27B

FIG. 3

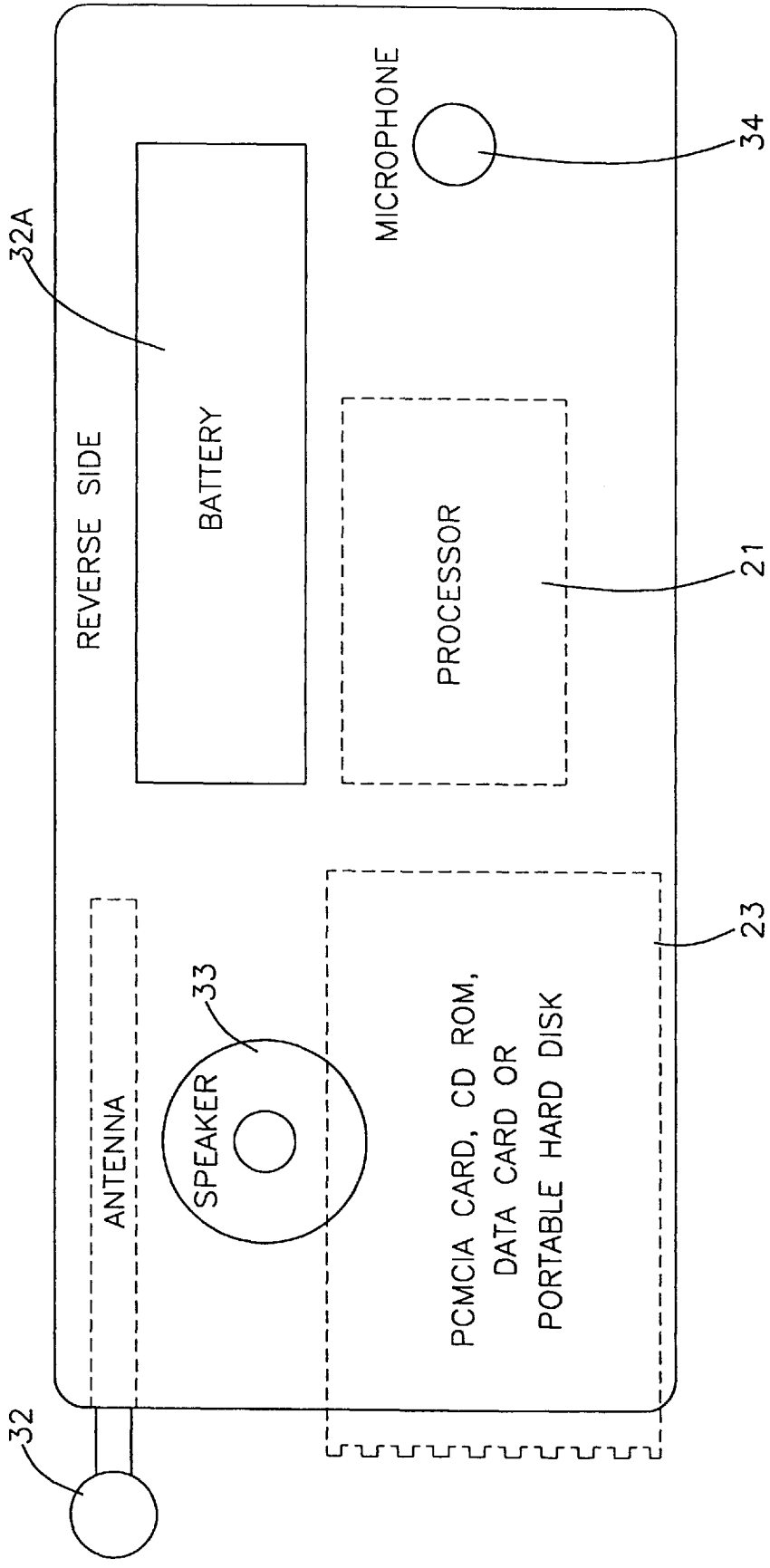

MICROPHONE
34
32A
REVERSE SIDE
BATTERY
PROCESSOR
21
23
ANTENNA
33
SPEAKER
PCMCIA CARD, CD ROM,
DATA CARD OR
PORTABLE HARD DISK
32

FIG. 4

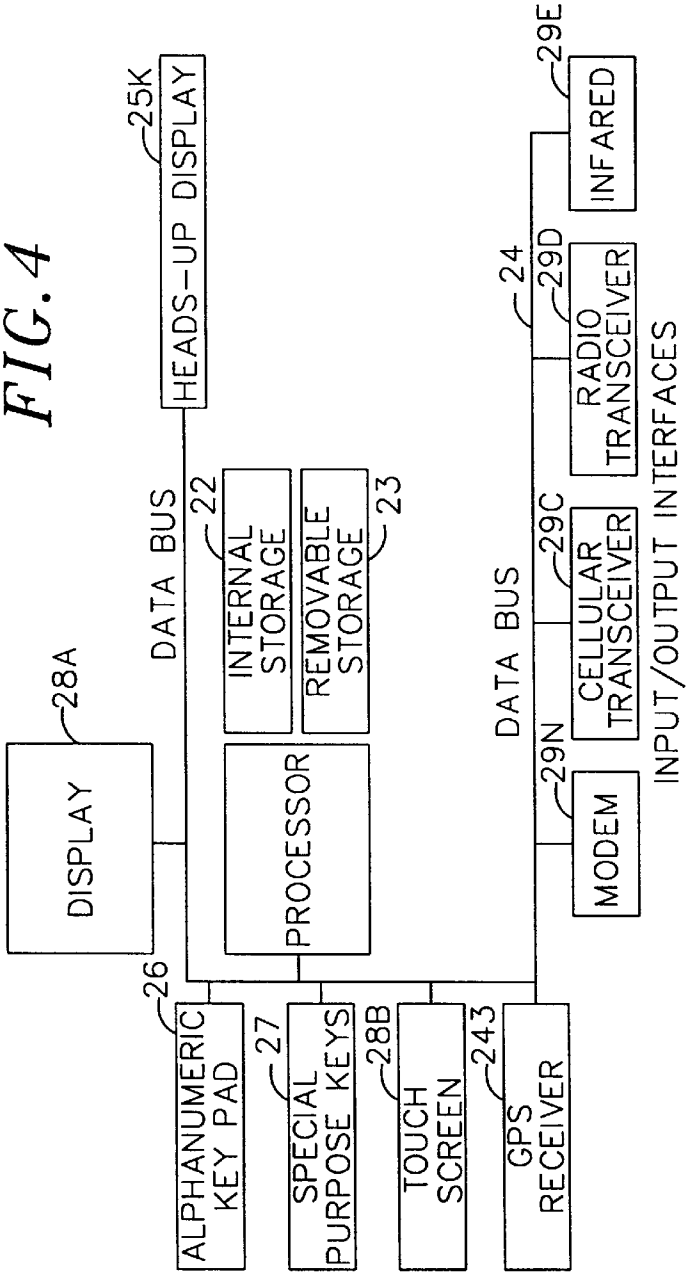

DISPLAY
28A
DATA BUS
26
HEADS-UP DISPLAY
25K
INTERNAL STORAGE
22
REMOVABLE STORAGE
23
PROCESSOR
ALPHANUMERIC KEY PAD
27
SPECIAL PURPOSE KEYS
28B
TOUCH SCREEN
243
GPS RECEIVER
DATA BUS
24
MODEM
29N
CELLULAR TRANSCEIVER
29C
RADIO TRANSCEIVER
29D
INFARED
29E
INPUT/OUTPUT INTERFACES

FIG. 4A

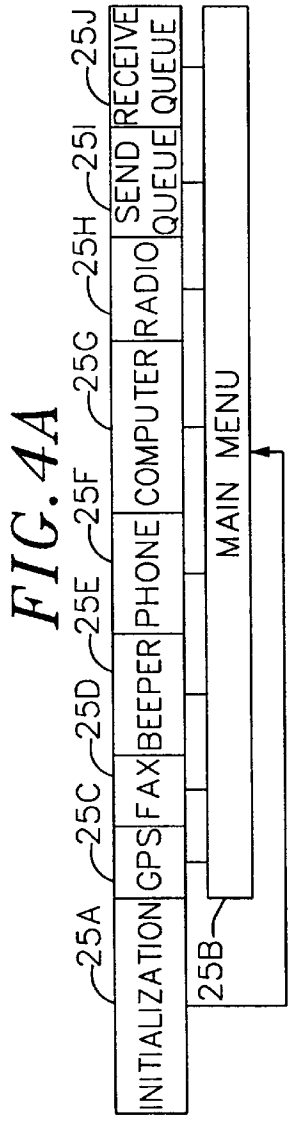
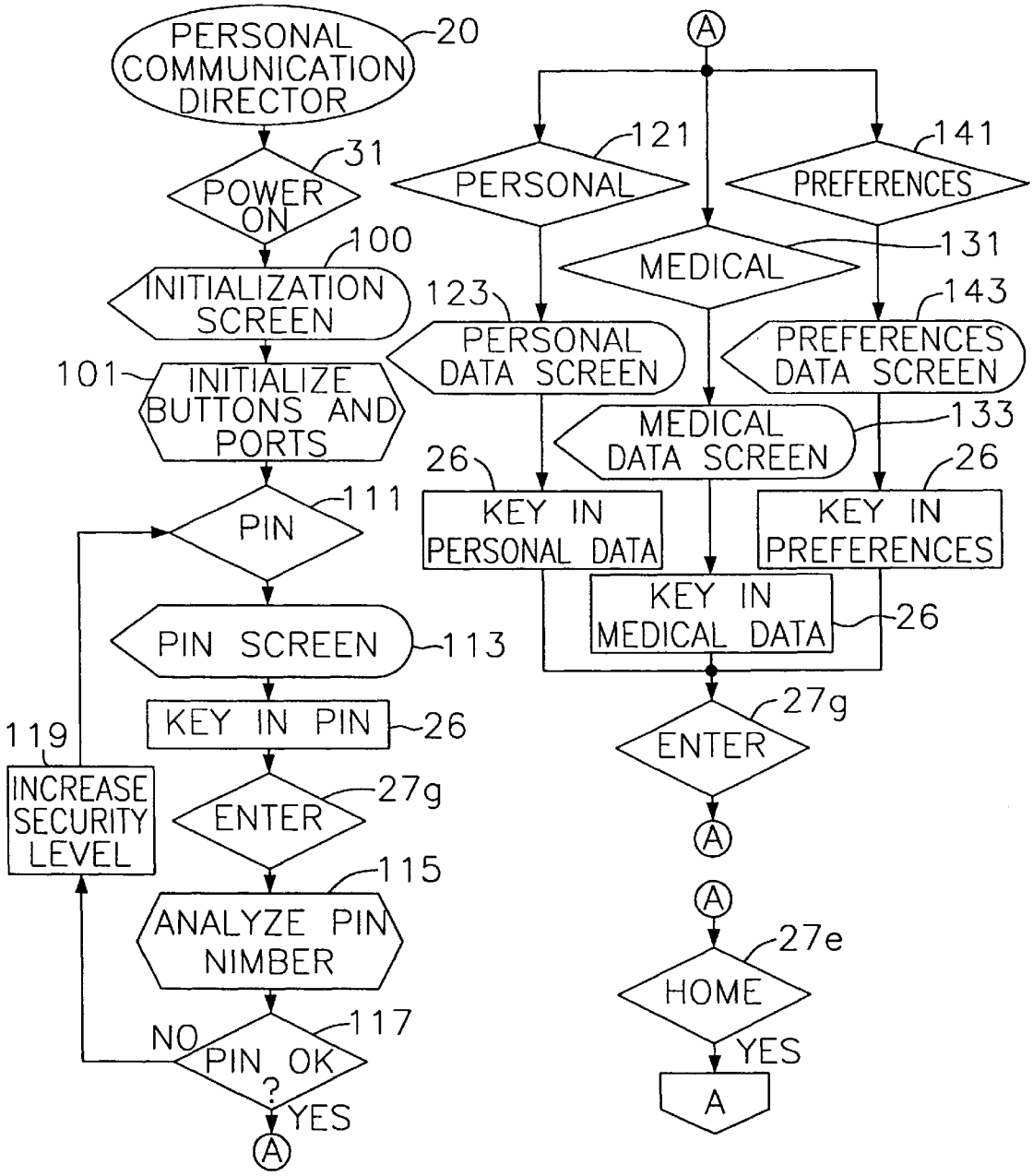

INITIALIZATION
25A
GPS
25C
FAX
25D
BEEPER
25E
PHONE
25F
COMPUTER
25G
RADIO
25H
SEND QUEUE
25I
RECEIVE QUEUE
25J
MAIN MENU
25B

FIG. 5A


PERSONAL COMMUNICATION DIRECTOR
20
POWER ON
31
INITIALIZATION SCREEN
100
INITIALIZE BUTTONS AND PORTS
101
PIN
111
PIN SCREEN
113
KEY IN PIN
26
ENTER
27g
ANALYZE PIN NIMBER
115
PIN OK ?
117
NO
YES
INCREASE SECURITY LEVEL
119
A
PERSONAL
121
PERSONAL DATA SCREEN
123
KEY IN PERSONAL DATA
26
MEDICAL
131
MEDICAL DATA SCREEN
133
KEY IN MEDICAL DATA
26
PREFERENCES
141
PREFERENCES DATA SCREEN
143
KEY IN PREFERENCES
26
ENTER
27g
HOME
27e
YES
A

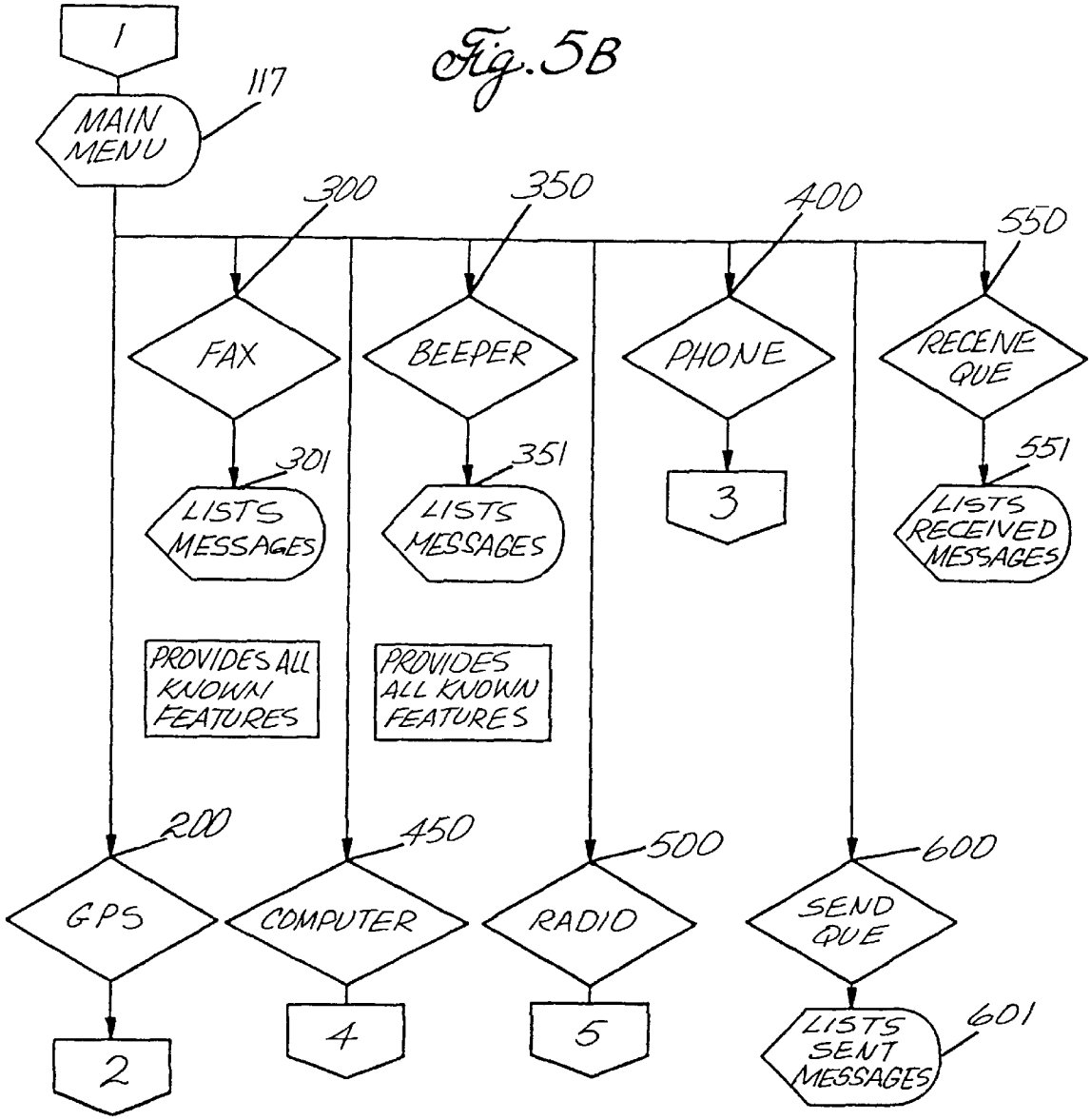

1
MAIN MENU
117
300
350
400
550
FAX
BEEPER
PHONE
RECENE QUE
301
351
551
LISTS MESSAGES
LISTS MESSAGES
3
LISTS RECEIVED MESSAGES
PROVIDES ALL KNOWN FEATURES
PROVIDES ALL KNOWN FEATURES
200
450
500
600
GPS
COMPUTER
RADIO
SEND QUE
2
4
5
LISTS SENT MESSAGES
601

Fig. 5B

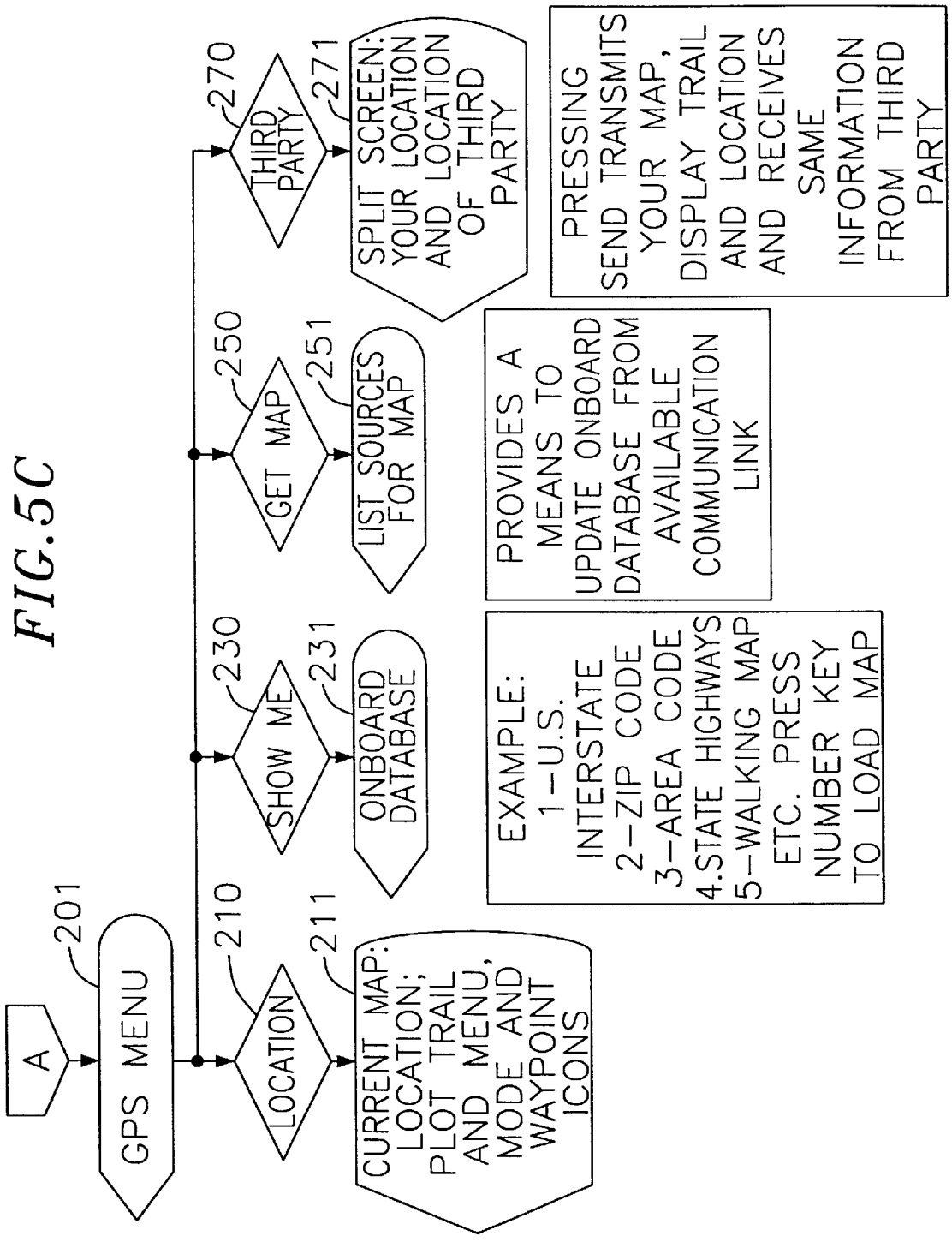

A
201
GPS MENU
210
LOCATION
211
CURRENT MAP: LOCATION; PLOT TRAIL AND MENU, MODE AND WAYPOINT ICONS
230
SHOW ME
231
ONBOARD DATABASE
250
GET MAP
251
LIST SOURCES FOR MAP
270
THIRD PARTY
271
SPLIT SCREEN: YOUR LOCATION AND LOCATION OF THIRD PARTY
EXAMPLE: 1-U.S. INTERSTATE 2-ZIP CODE 3-AREA CODE 4.STATE HIGHWAYS 5-WALKING MAP ETC. PRESS NUMBER KEY TO LOAD MAP
PROVIDES A MEANS TO UPDATE ONBOARD DATABASE FROM AVAILABLE COMMUNICATION LINK
PRESSING SEND TRANSMITS YOUR MAP, DISPLAY TRAIL AND LOCATION AND RECEIVES SAME INFORMATION FROM THIRD PARTY

FIG.5C

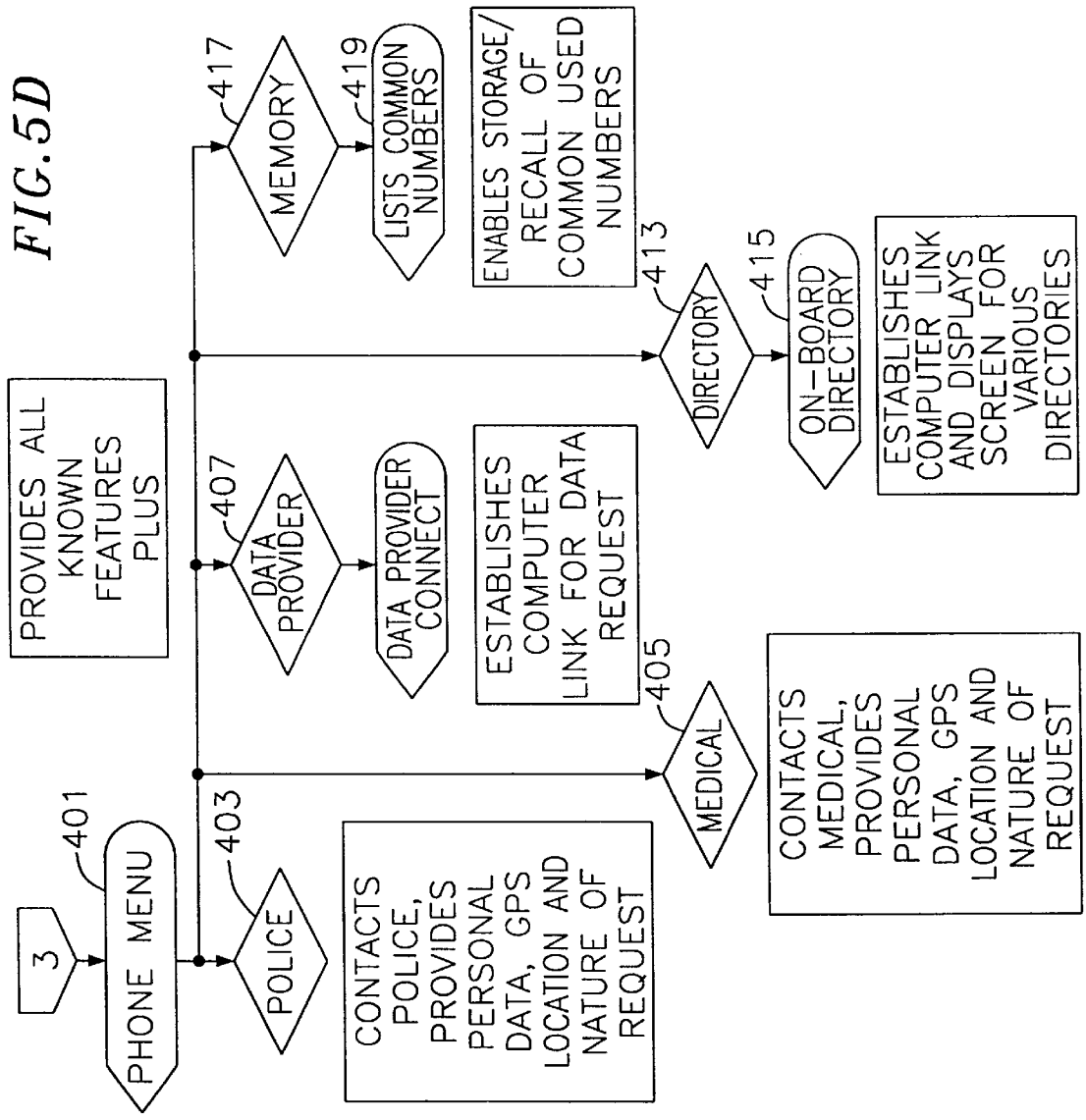
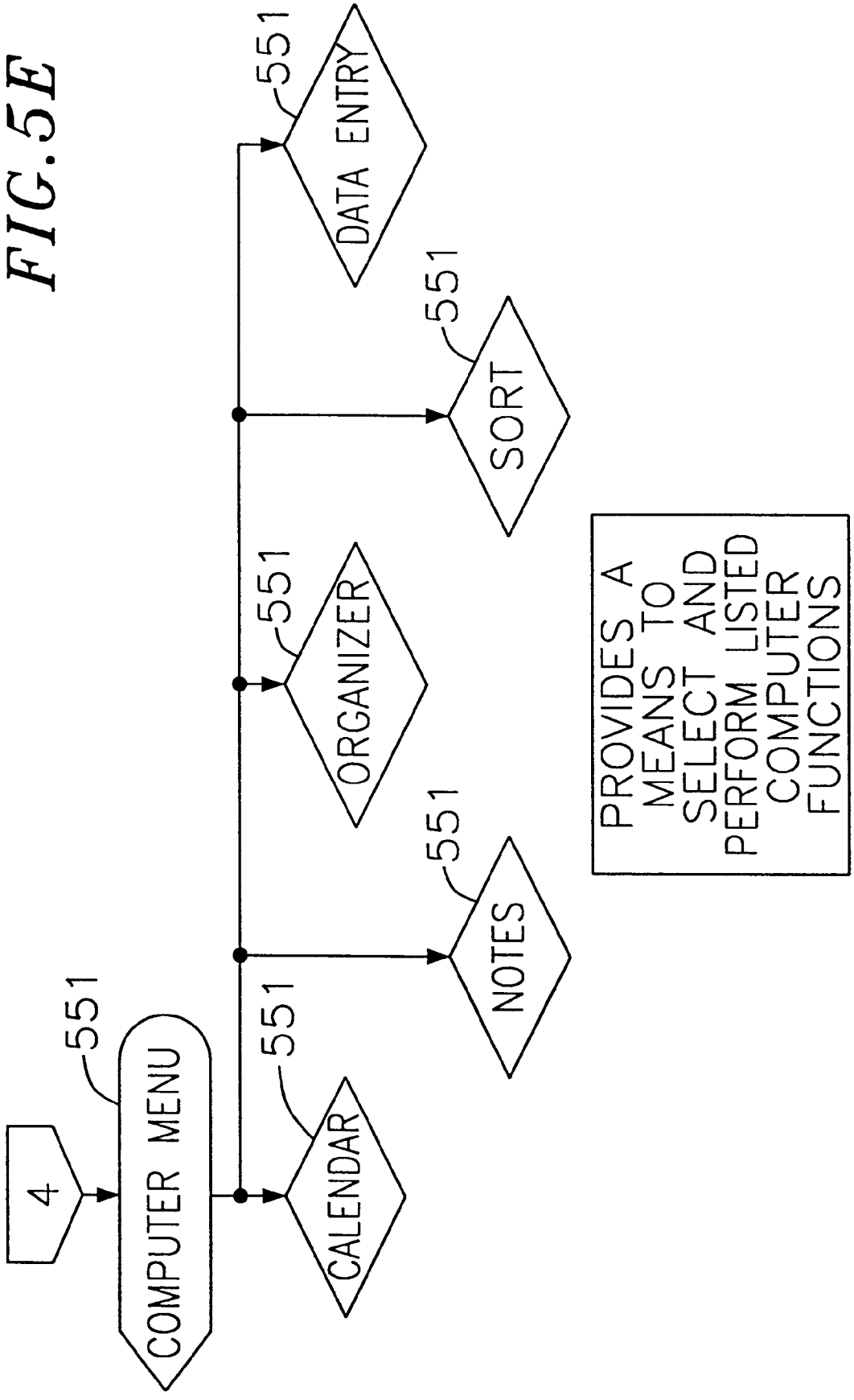

3
PHONE MENU
401
POLICE
403
CONTACTS POLICE, PROVIDES PERSONAL DATA, GPS LOCATION AND NATURE OF REQUEST
MEDICAL
405
CONTACTS MEDICAL, PROVIDES PERSONAL DATA, GPS LOCATION AND NATURE OF REQUEST
DATA PROVIDER
407
DATA PROVIDER CONNECT
ESTABLISHES COMPUTER LINK FOR DATA REQUEST
PROVIDES ALL KNOWN FEATURES PLUS
MEMORY
417
LISTS COMMON NUMBERS
419
ENABLES STORAGE/ RECALL OF COMMON USED NUMBERS
DIRECTORY
413
ON-BOARD DIRECTORY
415
ESTABLISHES COMPUTER LINK AND DISPLAYS SCREEN FOR VARIOUS DIRECTORIES

FIG. 5D

FIG.5E


4
COMPUTER MENU
551
CALENDAR
551
NOTES
551
ORGANIZER
551
SORT
551
DATA ENTRY
551
PROVIDES A MEANS TO SELECT AND PERFORM LISTED COMPUTER FUNCTIONS

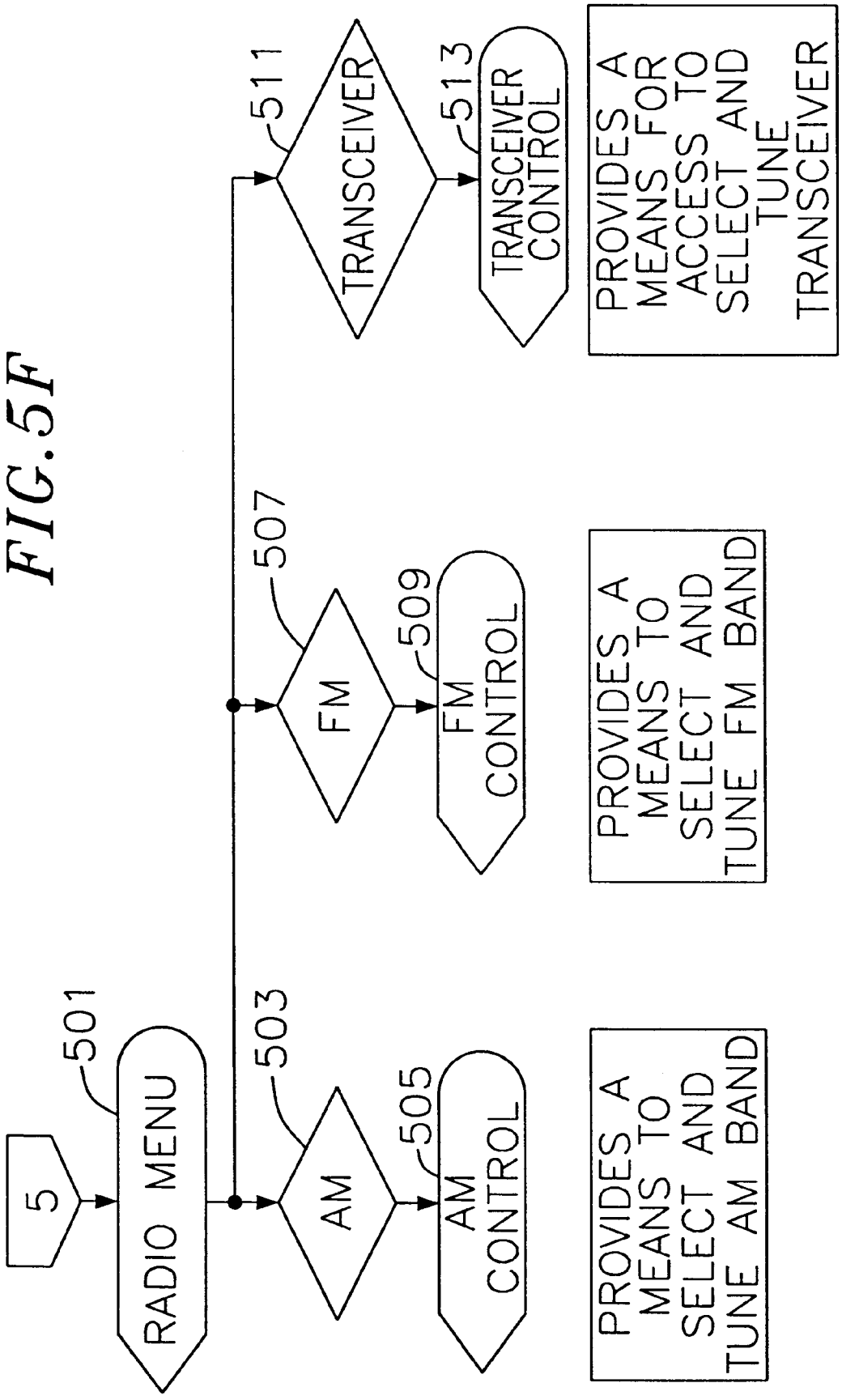

5
501
RADIO MENU
503
AM
505
AM CONTROL
PROVIDES A MEANS TO SELECT AND TUNE AM BAND
507
FM
509
FM CONTROL
PROVIDES A MEANS TO SELECT AND TUNE FM BAND
511
TRANSCEIVER
513
TRANSCEIVER CONTROL
PROVIDES A MEANS FOR ACCESS TO SELECT AND TUNE TRANSCEIVER

FIG. 5F

FIG. 6

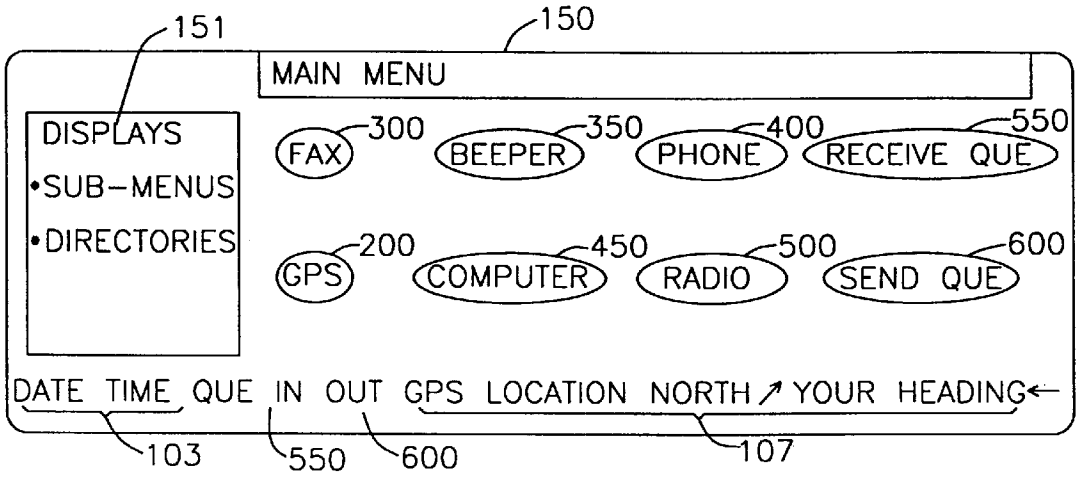

151
150
MAIN MENU
DISPLAYS
•SUB–MENUS
•DIRECTORIES
FAX
300
BEEPER
350
PHONE
400
RECEIVE QUE
550
GPS
200
COMPUTER
450
RADIO
500
SEND QUE
600
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
103
550
600
107

FIG. 7

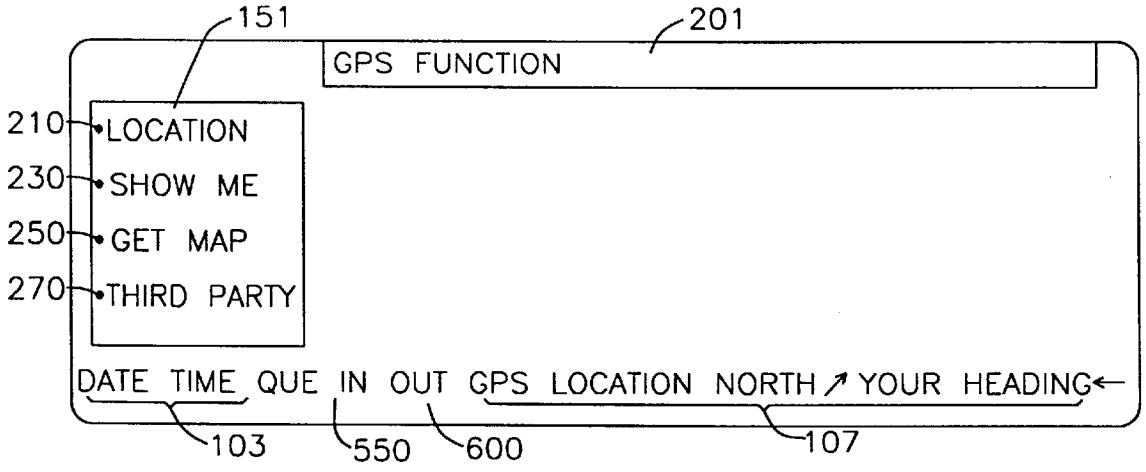

151
201
GPS FUNCTION
210
•LOCATION
230
•SHOW ME
250
•GET MAP
270
•THIRD PARTY
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
103
550
600
107

FIG. 8

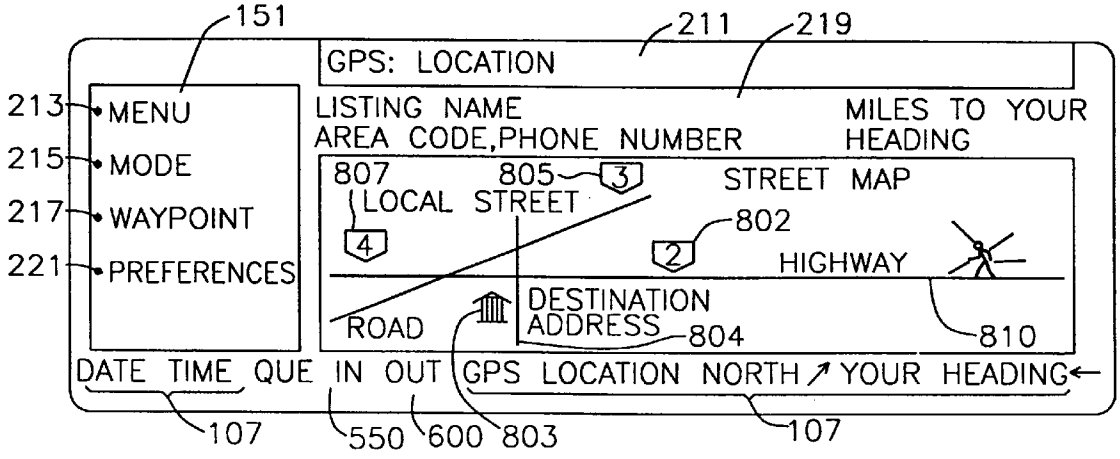

151
211
219
GPS: LOCATION
213
MENU
215
MODE
217
WAYPOINT
221
PREFERENCES
LISTING NAME
AREA CODE,PHONE NUMBER
MILES TO YOUR
HEADING
807
805
3
STREET MAP
LOCAL STREET
4
802
2
HIGHWAY
ROAD
DESTINATION
ADDRESS
804
810
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING
107
550
600
803
107

FIG. 9

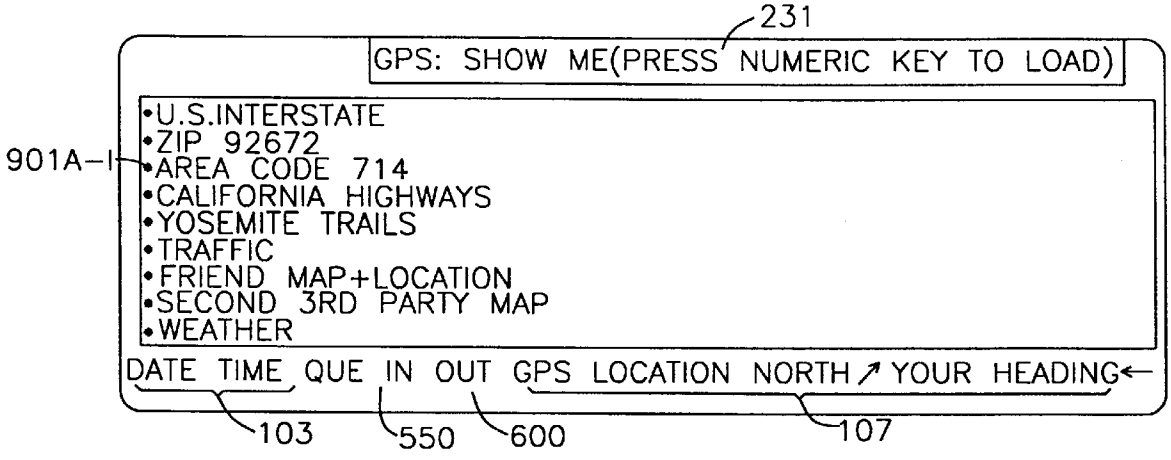

231
GPS: SHOW ME(PRESS NUMERIC KEY TO LOAD)
901A–I
•U.S.INTERSTATE
•ZIP 92672
•AREA CODE 714
•CALIFORNIA HIGHWAYS
•YOSEMITE TRAILS
•TRAFFIC
•FRIEND MAP+LOCATION
•SECOND 3RD PARTY MAP
•WEATHER
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING
103
550
600
107

FIG. 10

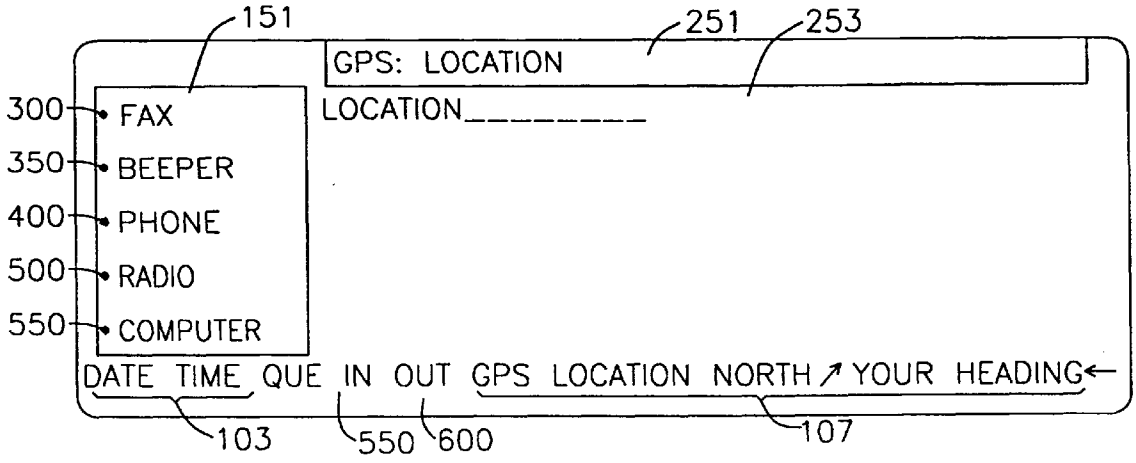

151
251
253
GPS: LOCATION
LOCATION_____
300
FAX
350
BEEPER
400
PHONE
500
RADIO
550
COMPUTER
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 11

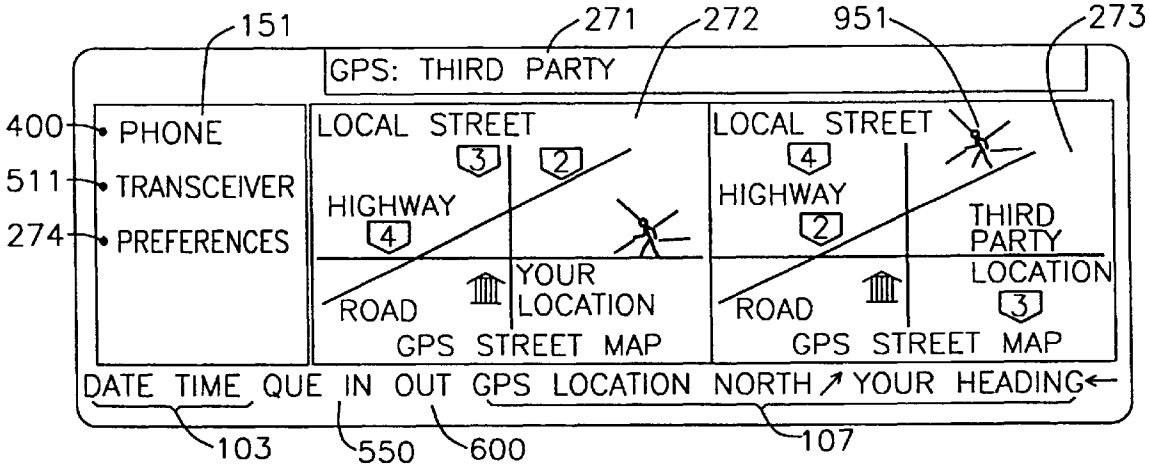

151
271
272
951
273
GPS: THIRD PARTY
400
PHONE
511
TRANSCEIVER
274
PREFERENCES
LOCAL STREET
3
2
HIGHWAY
4
ROAD
YOUR LOCATION
GPS STREET MAP
LOCAL STREET
4
HIGHWAY
2
THIRD PARTY LOCATION
3
ROAD
GPS STREET MAP
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 12

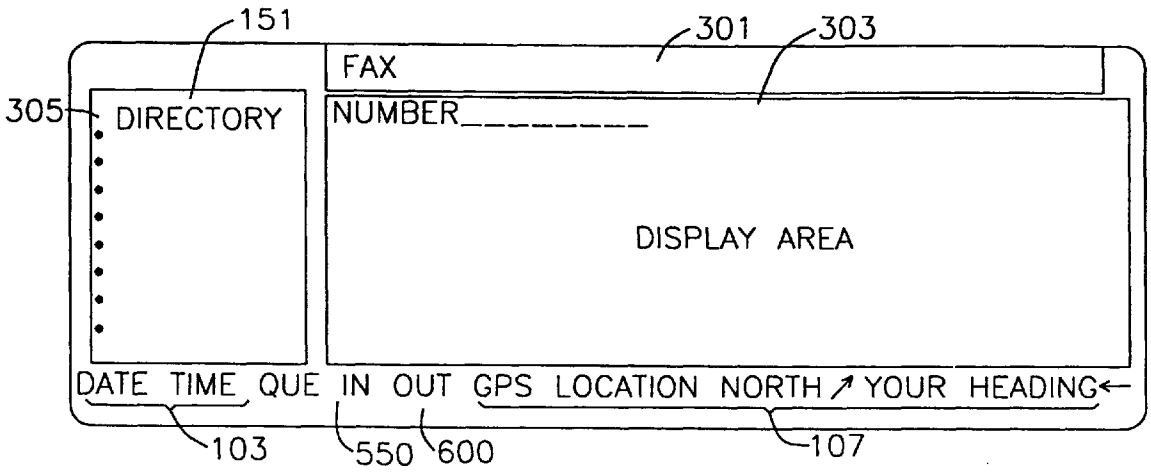

151
301
303
FAX
305
DIRECTORY
NUMBER_____
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 13

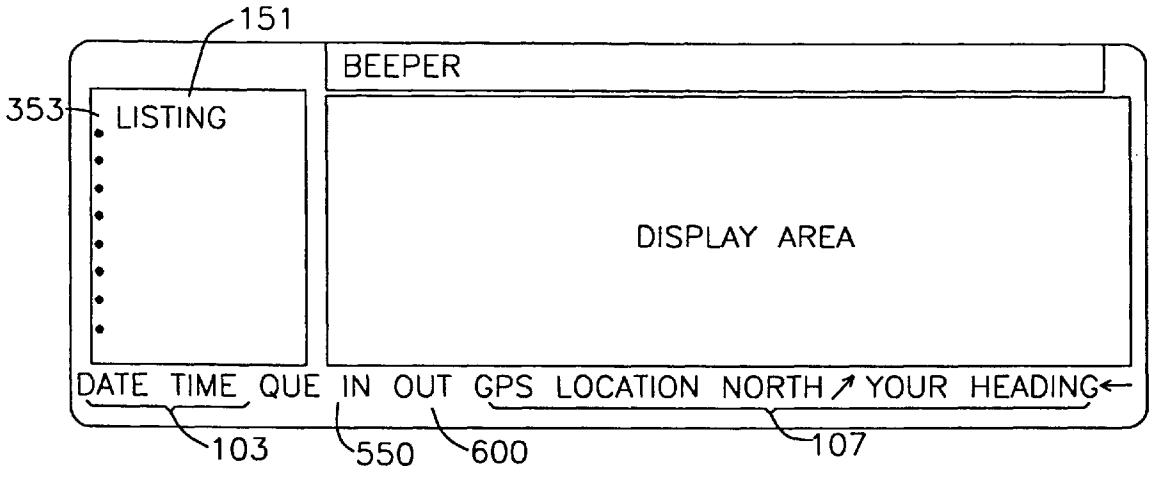

151
BEEPER
353
LISTING
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 14

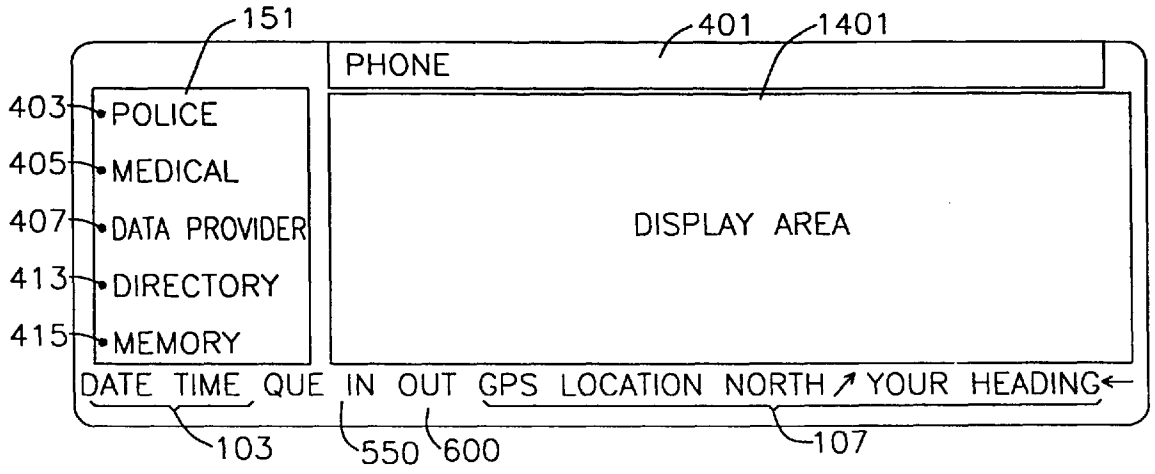

151
401
1401
PHONE
403
POLICE
405
MEDICAL
407
DATA PROVIDER
413
DIRECTORY
415
MEMORY
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 15

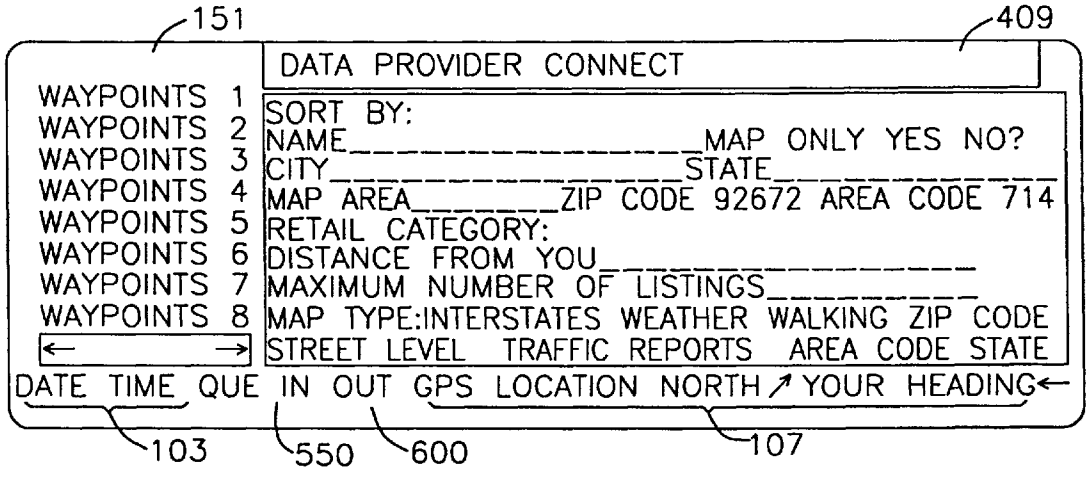

151
409
DATA PROVIDER CONNECT
WAYPOINTS 1
WAYPOINTS 2
WAYPOINTS 3
WAYPOINTS 4
WAYPOINTS 5
WAYPOINTS 6
WAYPOINTS 7
WAYPOINTS 8
SORT BY:
NAME_____MAP ONLY YES NO?
CITY_____STATE_____
MAP AREA_____ZIP CODE 92672 AREA CODE 714
RETAIL CATEGORY:
DISTANCE FROM YOU_____
MAXIMUM NUMBER OF LISTINGS_____
MAP TYPE:INTERSTATES WEATHER WALKING ZIP CODE
STREET LEVEL TRAFFIC REPORTS AREA CODE STATE
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 16

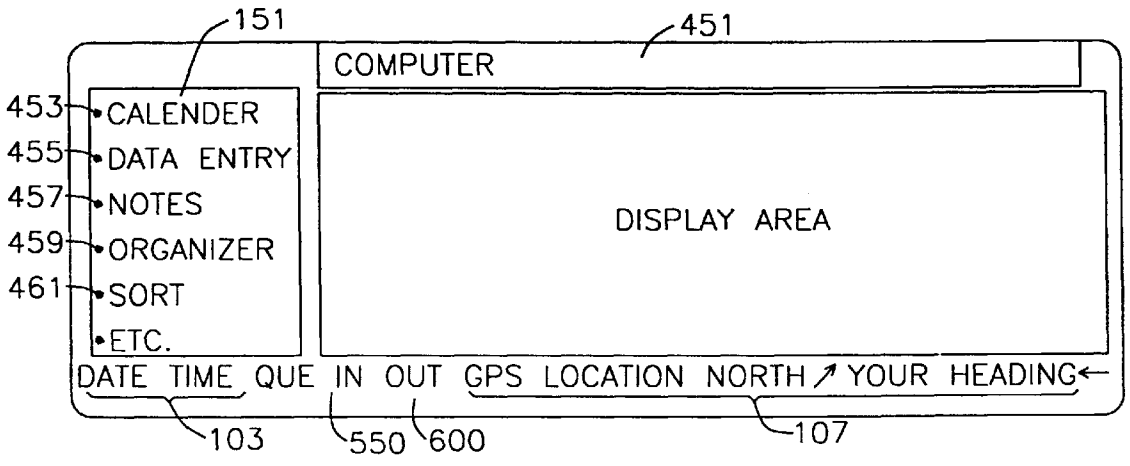

151
451
COMPUTER
453
CALENDER
455
DATA ENTRY
457
NOTES
459
ORGANIZER
461
SORT
ETC.
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
103
550
600
107

FIG. 17

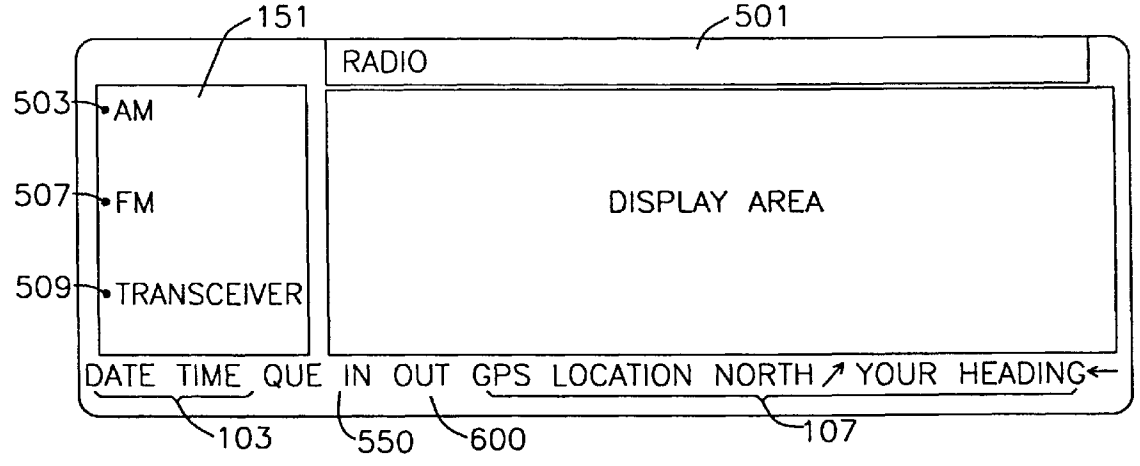

151
501
RADIO
503
AM
507
FM
509
TRANSCEIVER
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
103
550
600
107

FIG. 18

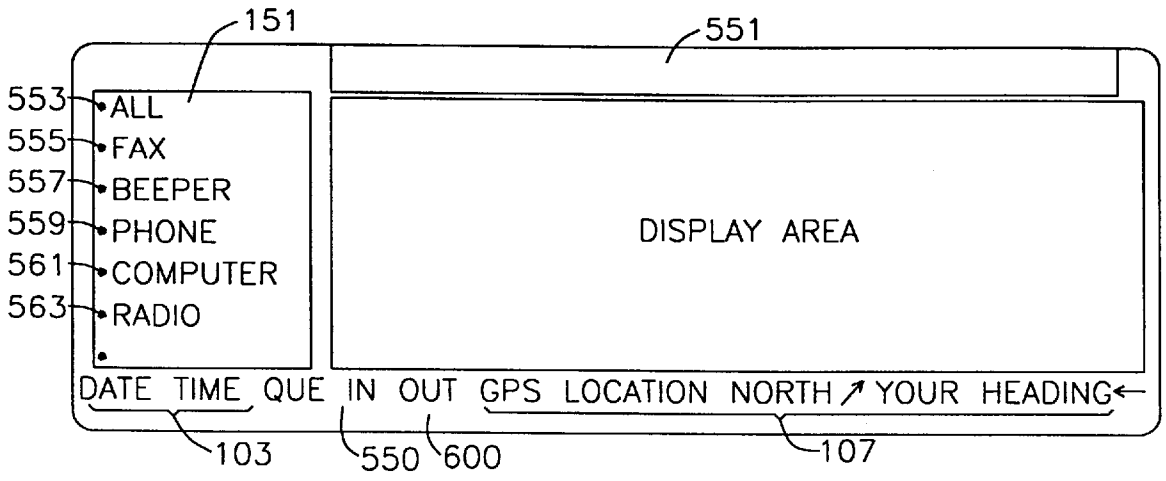

151
551
553
555
557
559
561
563
ALL
FAX
BEEPER
PHONE
COMPUTER
RADIO
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
103
550
600
107

FIG. 19

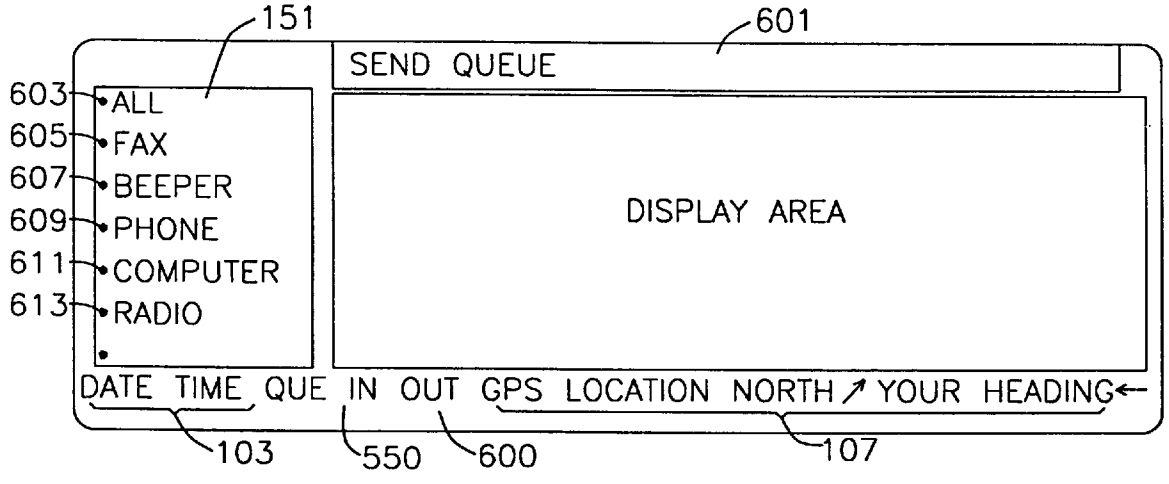

151
601
SEND QUEUE
603
605
607
609
611
613
ALL
FAX
BEEPER
PHONE
COMPUTER
RADIO
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
103
550
600
107

FIG. 20

LISTING / NAME / WAYPOINT	ADDRESS	CITY	STATE	PHONE NO	GPS LOCATION NORTH	GPS WEST	WAYPOINT
ALEX'S GERMAN-AMERICAN RESTAURANT	2801 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-8986	33°24.60	117°36.25	1
ANTOINE'S CAFE	218 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-1763	33°25.40	117°37.38	2
BAKERS'S SQUARE RESTAURANT & PIES	610 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-661-3100	33°27.80	117°39.60	3
BEACH GARDEN CAFE	618 1/2 AVENIDA VICTORIA	SAN CLEMENTE	CA	714-498-8145	33°25.35	117°37.36	4
BOOTLEGGERS GRILL & SPEAKEASY	111 AVE. PALIZADA	SAN CLEMENTE	CA	714-361-8658	33°25.65	117°37.85	5
BURBON STREET SANDWICHERY	430 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-7827	33°25.58	117°37.76	6
BURGER STOP	524 AVENIDA PICO	SAN CLEMENTE	CA	714-492-2350	33°25.92	117°37.12	7
BURRITO BASKET, THE	2017 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-5002	33°25.10	117°36.34	8
CAFE CALYPSO	114 AVENIDA DEL MAR	SAN CLEMENTE	CA	714-366-9346	33°25.42	117°37.42	9
CAFE EXPRESSO	641 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-240-3467	33°25.81	117°37.31	10
CAPTAIN CULVER COUNTERCULTURE NATURAL FOODS	149 AVENIDA DEL MAR	SAN CLEMENTE	CA	714-498-8098	33°25.39	117°37.40	11
CARL'S JR. RESTAURANT	638 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-493-0189	33°27.65	117°39.45	12
CARL'S JR. RESTAURANT	3929 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-5641	33°24.50	117°35.95	13
CARROWS RESTAURANT	620 AVENIDA PICO	SAN CLEMENTE	CA	714-492-4290	33°25.85	117°37.10	14
CHINA BEACH CANTEEN	2369 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-6228	33°27.80	117°37.15	15
CHINA WELL RESTAURANT	620 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-661-6813	33°27.61	117°39.42	16
COCO'S FAMILY RESTAURANT	2350 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-1542	33°24.90	117°36.18	17
CORKY'S CAFE	2727 VIA CASCADITA	SAN CLEMENTE	CA	714-492-1135	33°25.10	117°37.48	18
COURTSIDE RESTAURANT	111 AVE. VISTA MONTANA	SAN CLEMENTE	CA	714-361-2211	33°25.10	117°36.10	19
DAVE'S MEXICAN RESTAURANT	1701 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-7867	33°25.50	117°38.90	20
DEL TACO	109 CALLE DE INDUSTRIAS	SAN CLEMENTE	CA	714-492-5311	33°25.51	117°36.50	21
DENNY'S RESTAURANT	529 AVENIDA PICO	SAN CLEMENTE	CA	714-492-2382	33°25.48	117°36.15	22
DOMINOES PIZZA	1502 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-9002	33°25.25	117°37.50	23
EASTERN WINDS	201 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-3008	33°25.01	117°37.05	24
EL CAMINO TACOS	420 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-366-8358	33°25.10	117°37.25	25
EL JEFE CAFE	106 E. ESCALONES	SAN CLEMENTE	CA	714-492-4010	33°25.25	117°37.03	26
EL MIRADOR	301 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-366-0855	33°25.08	117°37.10	27

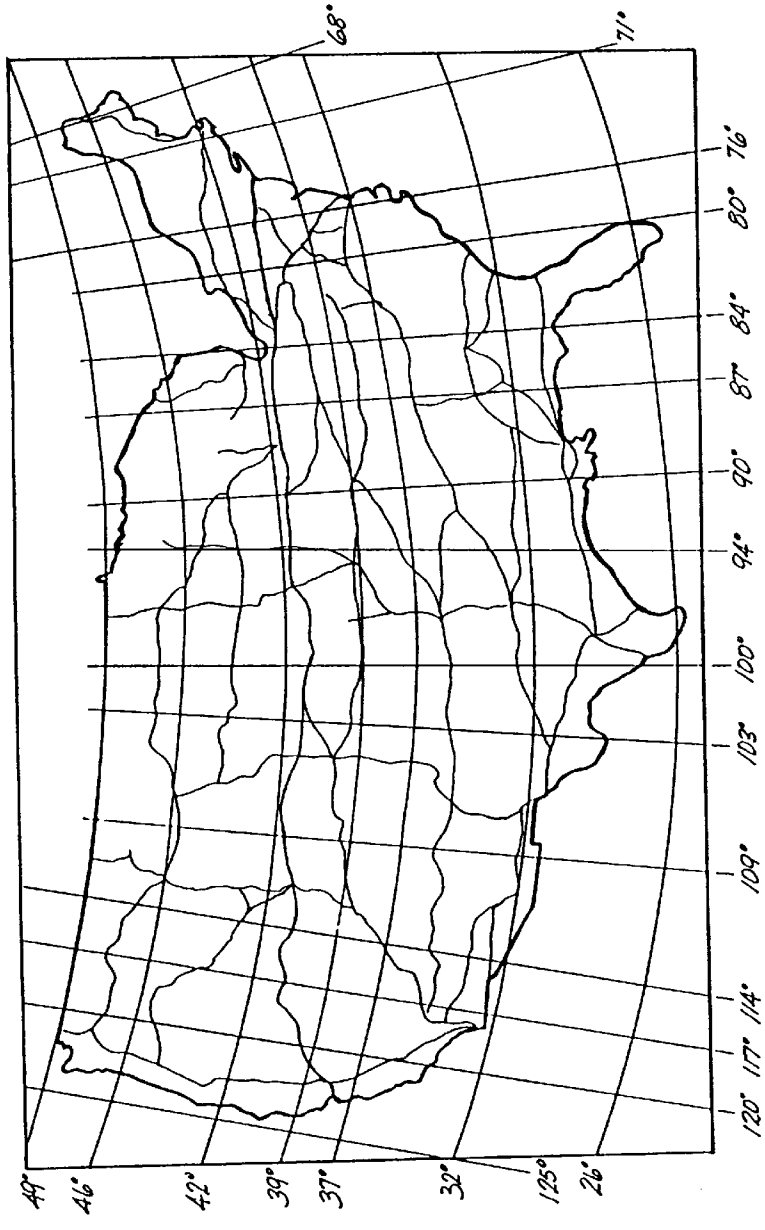


Fig. 21

1115 ● LONGITUDE AND LATITUDE COORDINATES.
● AREA CODE BOUNDARIES.
● ZIP CODE BOUNDARIES.
● NATIONAL PARK BOUNDARIES.
● METRO TRAFFIC ZONES
● INTERSTATE BOUNDARIES
● US HIGHWAY BOUNDARIES
● STATE ROUTE BOUNDARIES
● CITY, COUNTY, STATE, PROVINCE BOUNDARIES.
● POLITICAL BOUNDARIES.
● ECONOMIC, RETAIL, BUSINESS ZONE BOUNDARIES.
GPS ENCODED EMBODIMENTS ARE NOT LIMITED TO THE ABOVE EXAMPLES AND MAY INCLUDE MANY OTHER SYSTEMS USING VARIOUS RECORDING TECHNIQUES

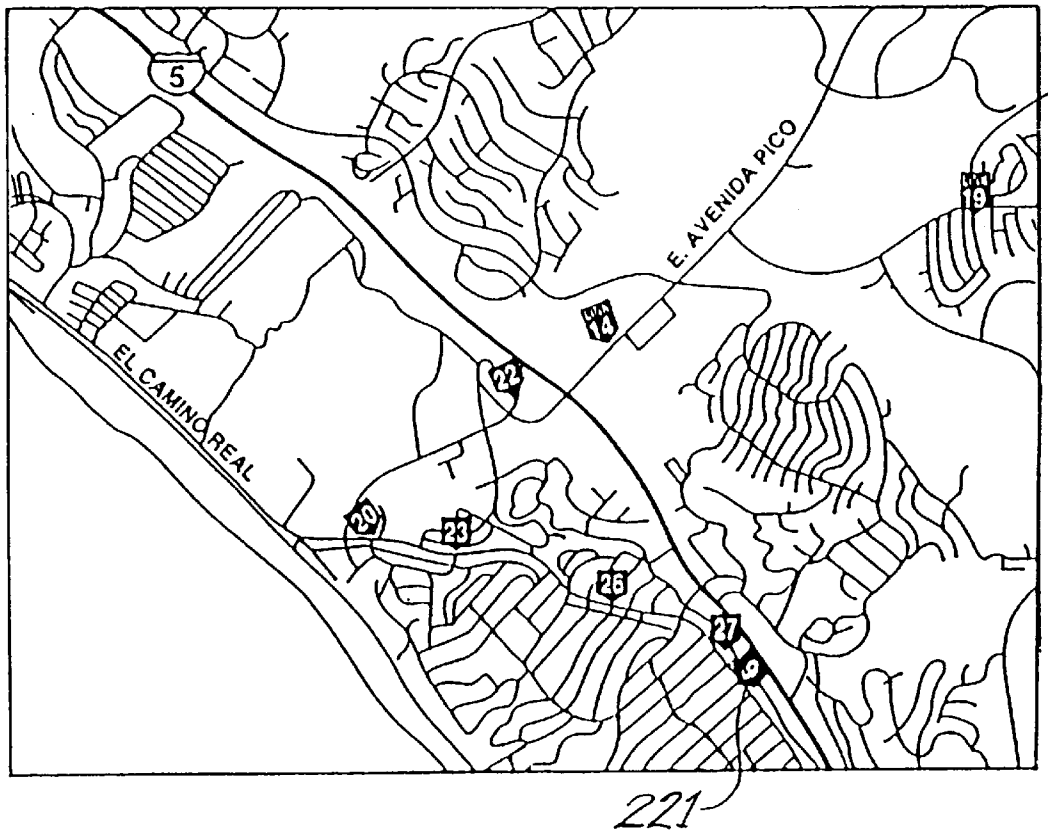


Fig. 22

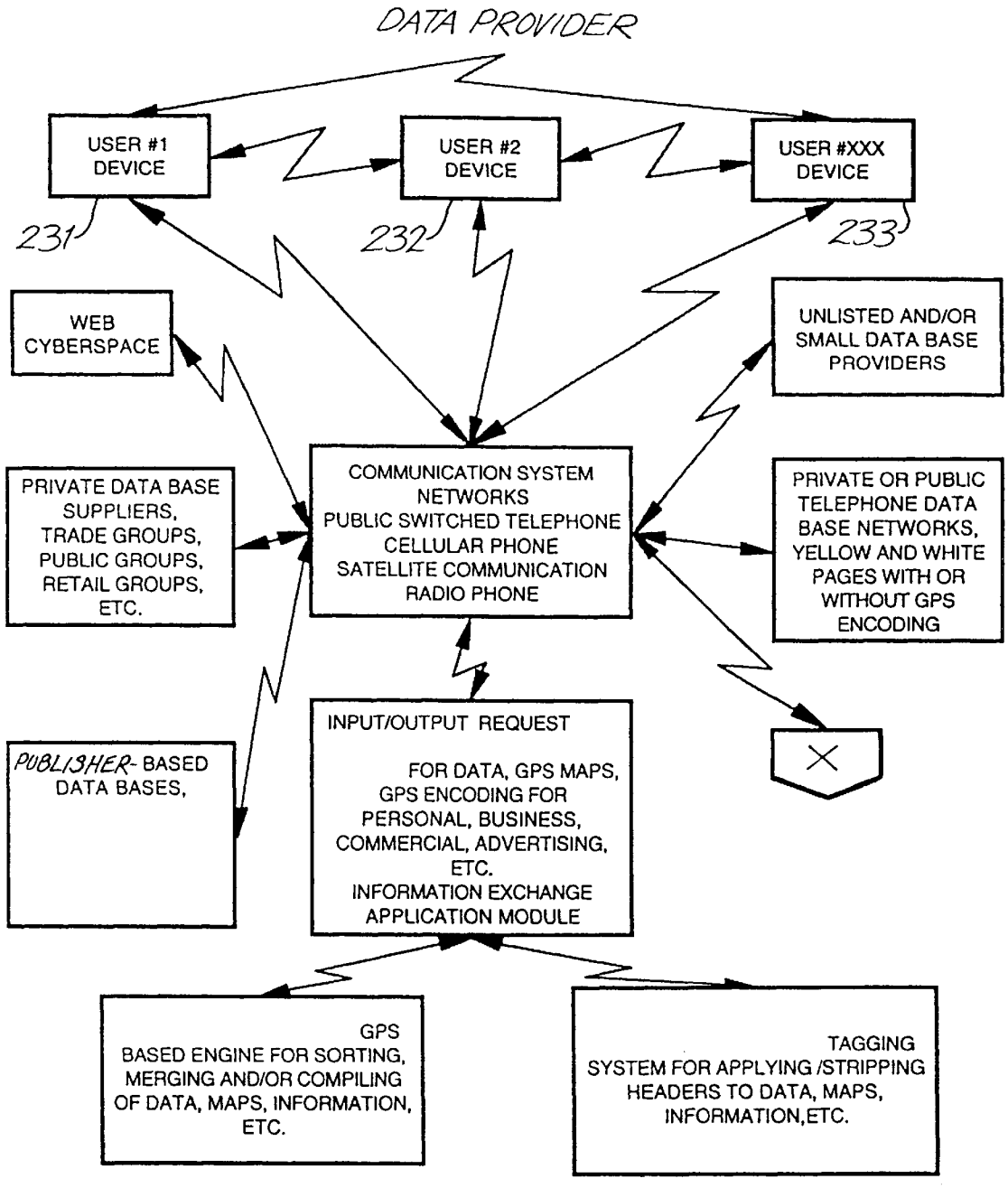

DATA PROVIDER
USER #1 DEVICE
USER #2 DEVICE
USER #XXX DEVICE
231
232
233
WEB CYBERSPACE
UNLISTED AND/OR SMALL DATA BASE PROVIDERS
PRIVATE DATA BASE SUPPLIERS, TRADE GROUPS, PUBLIC GROUPS, RETAIL GROUPS, ETC.
COMMUNICATION SYSTEM NETWORKS
PUBLIC SWITCHED TELEPHONE
CELLULAR PHONE
SATELLITE COMMUNICATION
RADIO PHONE
PRIVATE OR PUBLIC TELEPHONE DATA BASE NETWORKS, YELLOW AND WHITE PAGES WITH OR WITHOUT GPS ENCODING
PUBLISHER- BASED DATA BASES,
INPUT/OUTPUT REQUEST
FOR DATA, GPS MAPS, GPS ENCODING FOR PERSONAL, BUSINESS, COMMERCIAL, ADVERTISING, ETC.
INFORMATION EXCHANGE APPLICATION MODULE
GPS BASED ENGINE FOR SORTING, MERGING AND/OR COMPILING OF DATA, MAPS, INFORMATION, ETC.
TAGGING SYSTEM FOR APPLYING /STRIPPING HEADERS TO DATA, MAPS, INFORMATION,ETC.

Fig. 23A

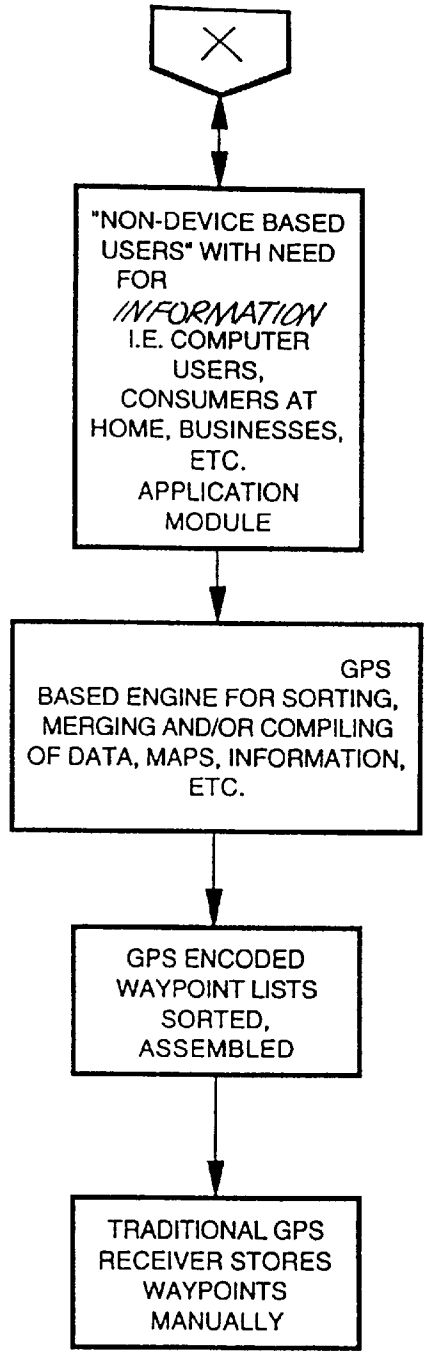

"NON-DEVICE BASED USERS" WITH NEED FOR INFORMATION I.E. COMPUTER USERS, CONSUMERS AT HOME, BUSINESSES, ETC. APPLICATION MODULE
GPS BASED ENGINE FOR SORTING, MERGING AND/OR COMPILING OF DATA, MAPS, INFORMATION, ETC.
GPS ENCODED WAYPOINT LISTS SORTED, ASSEMBLED
TRADITIONAL GPS RECEIVER STORES WAYPOINTS MANUALLY

Fig. 23B

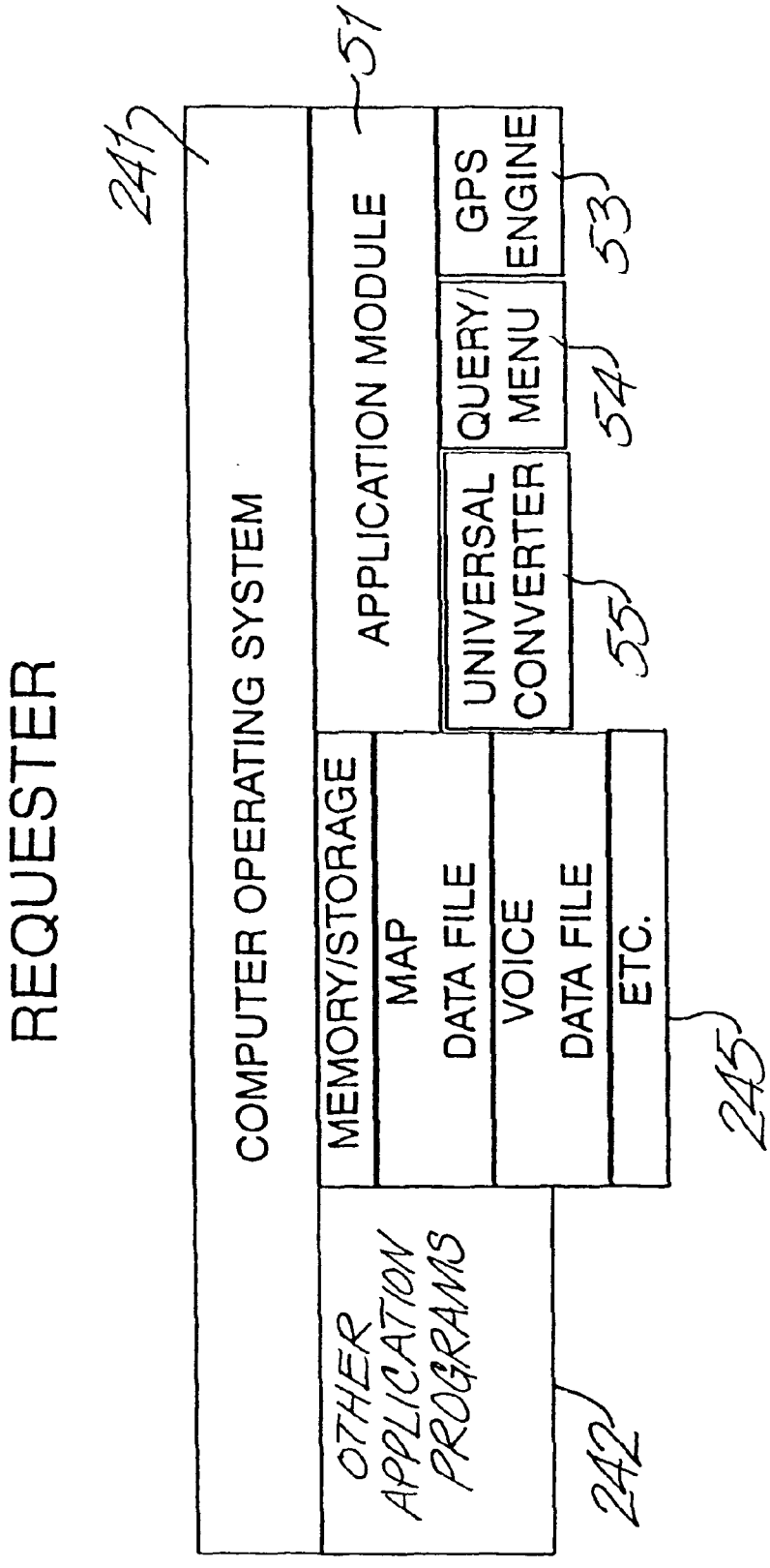

REQUESTER
241
COMPUTER OPERATING SYSTEM
51
APPLICATION MODULE
GPS ENGINE
53
QUERY/ MENU
54
UNIVERSAL CONVERTER
55
MEMORY/STORAGE
MAP DATA FILE
VOICE DATA FILE
ETC.
245
OTHER APPLICATION PROGRAMS
242

Fig. 24

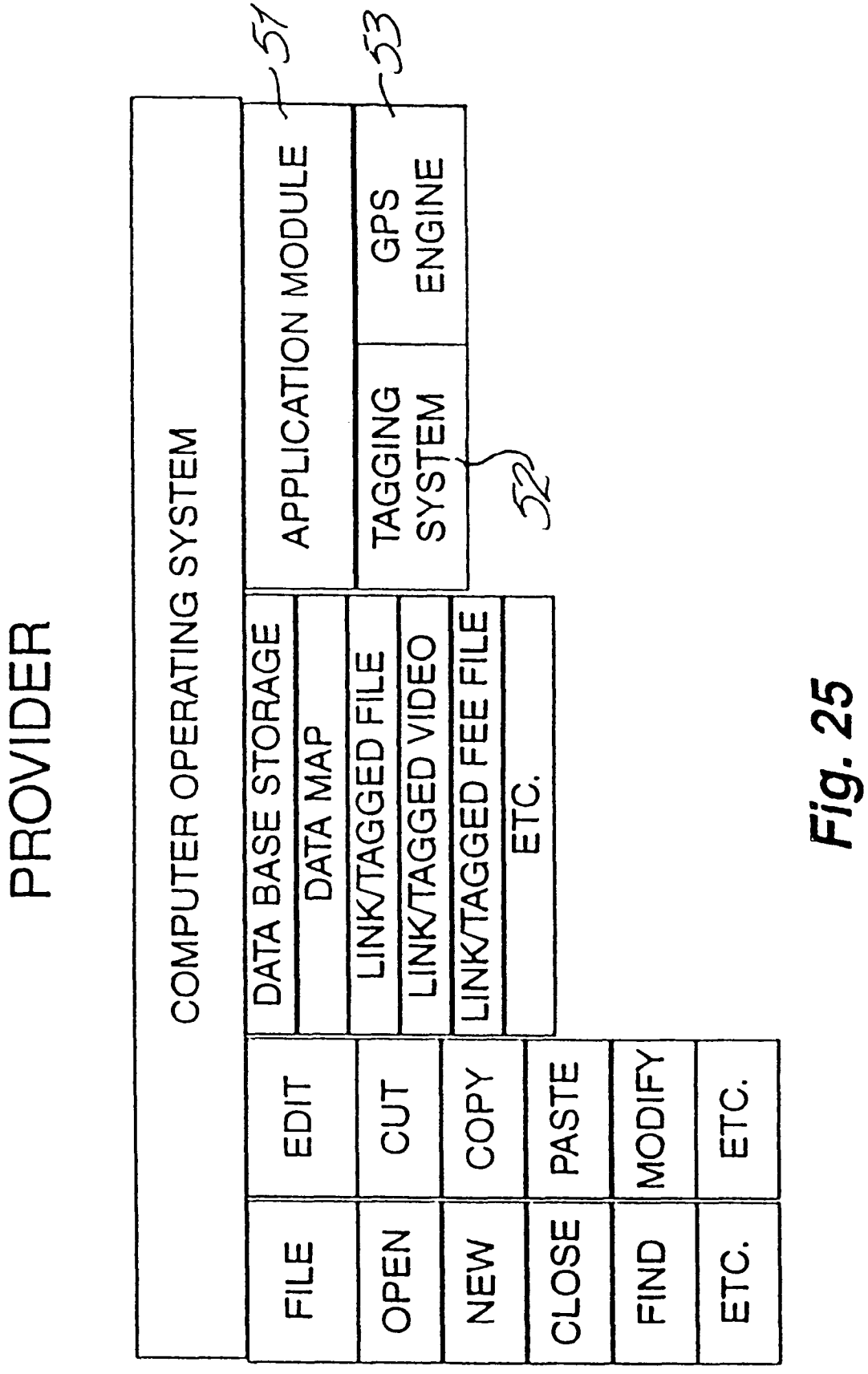

PROVIDER
COMPUTER OPERATING SYSTEM
APPLICATION MODULE
51
GPS ENGINE
53
TAGGING SYSTEM
52
DATA BASE STORAGE
DATA MAP
LINK/TAGGED FILE
LINK/TAGGED VIDEO
LINK/TAGGED FEE FILE
ETC.
EDIT
CUT
COPY
PASTE
MODIFY
ETC.
FILE
OPEN
NEW
CLOSE
FIND
ETC.

Fig. 25

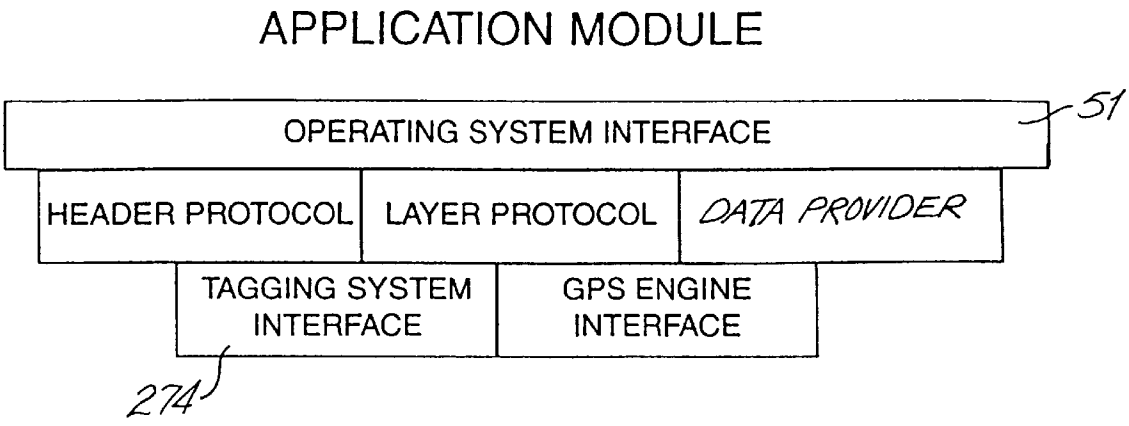

APPLICATION MODULE
OPERATING SYSTEM INTERFACE
51
HEADER PROTOCOL
LAYER PROTOCOL
DATA PROVIDER
TAGGING SYSTEM INTERFACE
GPS ENGINE INTERFACE
274

Fig. 26

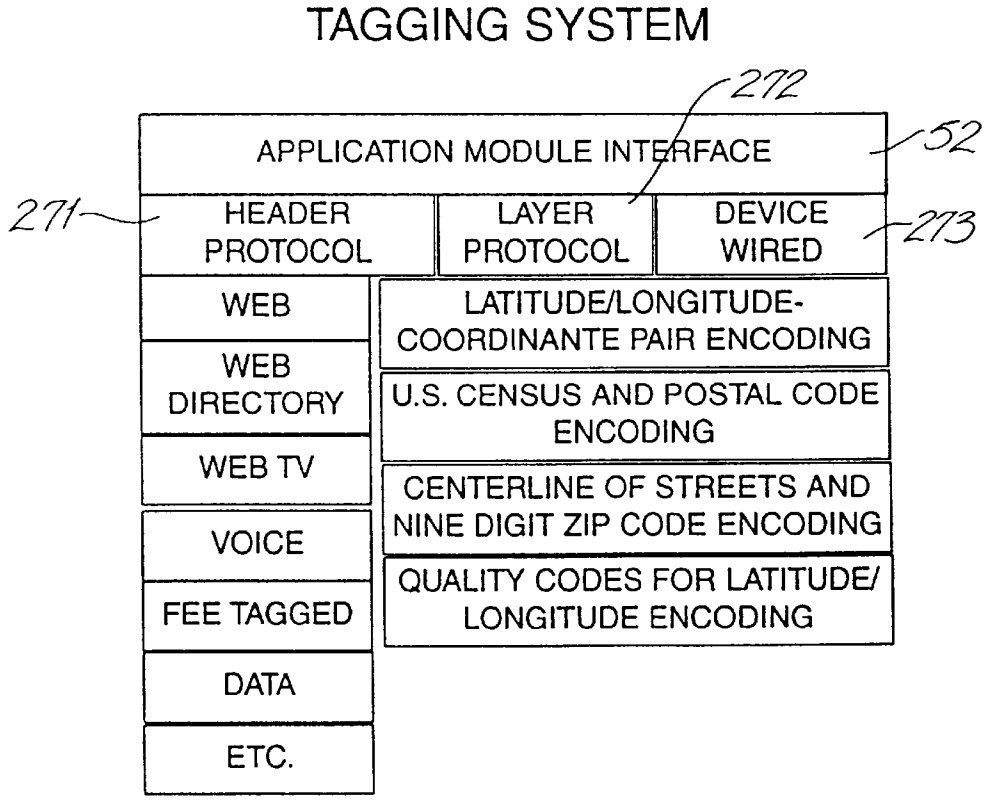

TAGGING SYSTEM
272
APPLICATION MODULE INTERFACE
52
271
HEADER PROTOCOL
LAYER PROTOCOL
DEVICE WIRED
273
WEB
WEB DIRECTORY
WEB TV
VOICE
FEE TAGGED
DATA
ETC.
LATITUDE/LONGITUDE-COORDINANTE PAIR ENCODING
U.S. CENSUS AND POSTAL CODE ENCODING
CENTERLINE OF STREETS AND NINE DIGIT ZIP CODE ENCODING
QUALITY CODES FOR LATITUDE/LONGITUDE ENCODING

Fig. 27

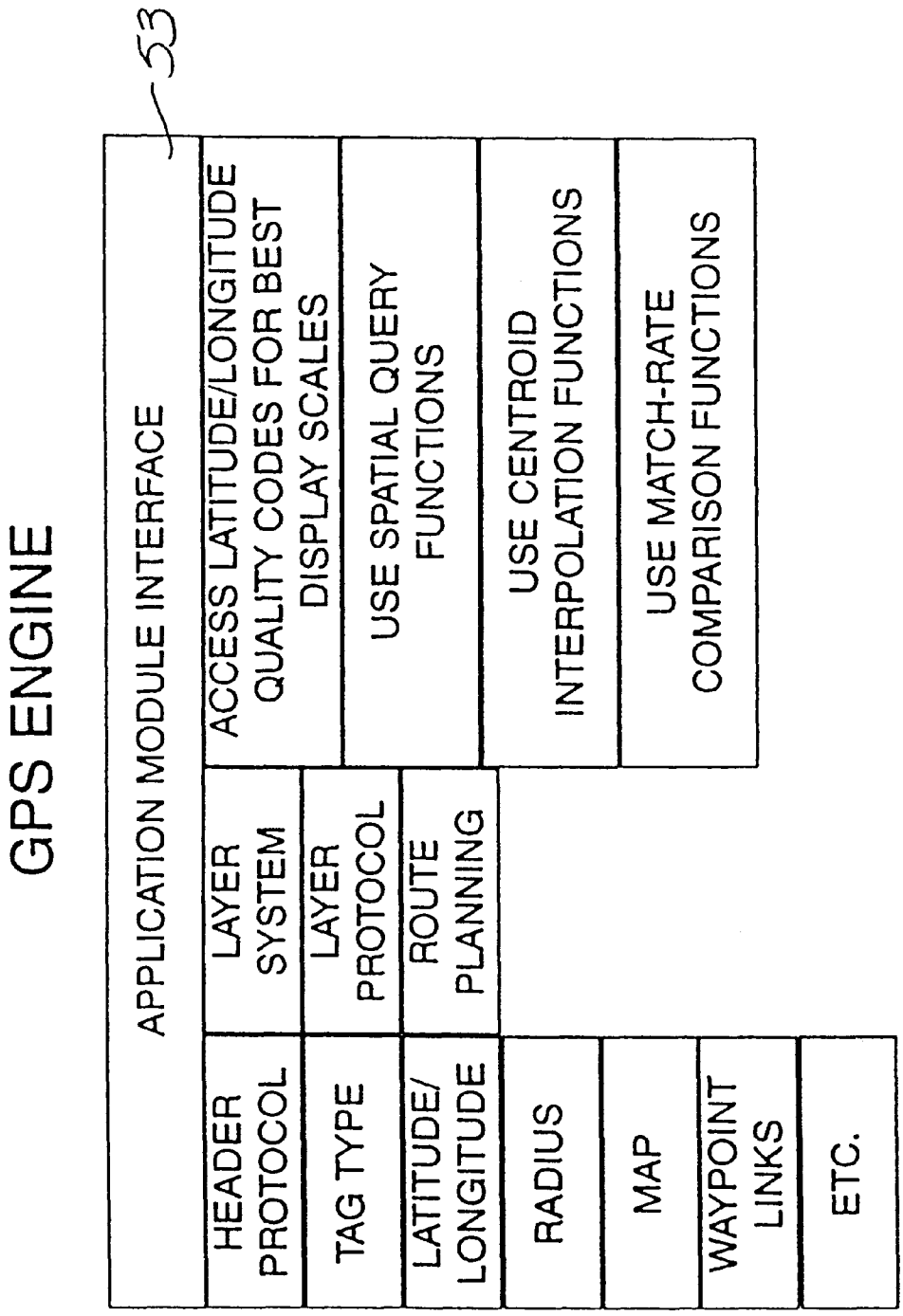

GPS ENGINE
53
APPLICATION MODULE INTERFACE
LAYER SYSTEM
LAYER PROTOCOL
ROUTE PLANNING
ACCESS LATITUDE/LONGITUDE QUALITY CODES FOR BEST DISPLAY SCALES
USE SPATIAL QUERY FUNCTIONS
USE CENTROID INTERPOLATION FUNCTIONS
USE MATCH-RATE COMPARISON FUNCTIONS
HEADER PROTOCOL
TAG TYPE
LATITUDE/ LONGITUDE
RADIUS
MAP
WAYPOINT LINKS
ETC.

Fig. 28

UNIVERSAL
TRANSLATOR

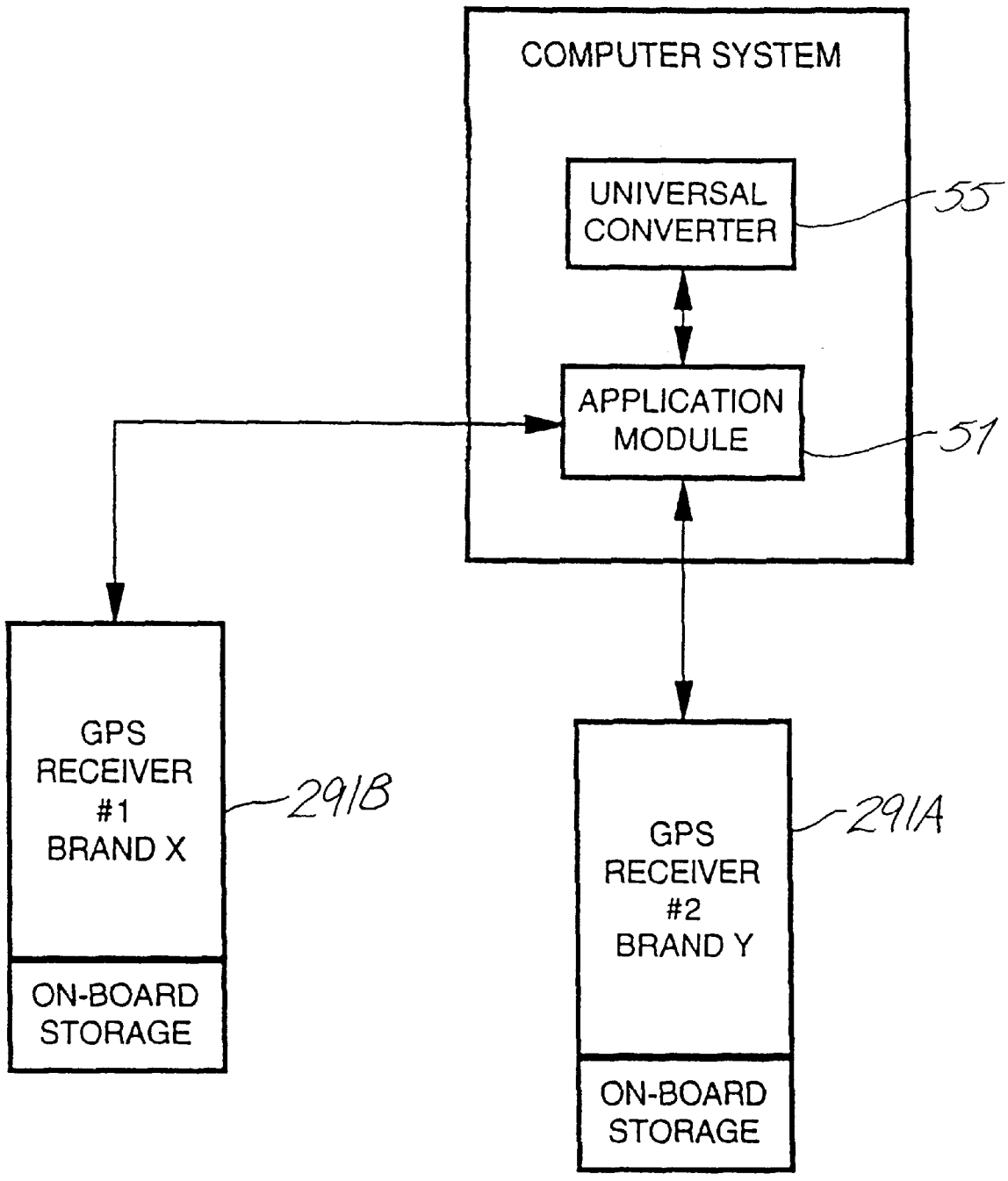


Fig. 29

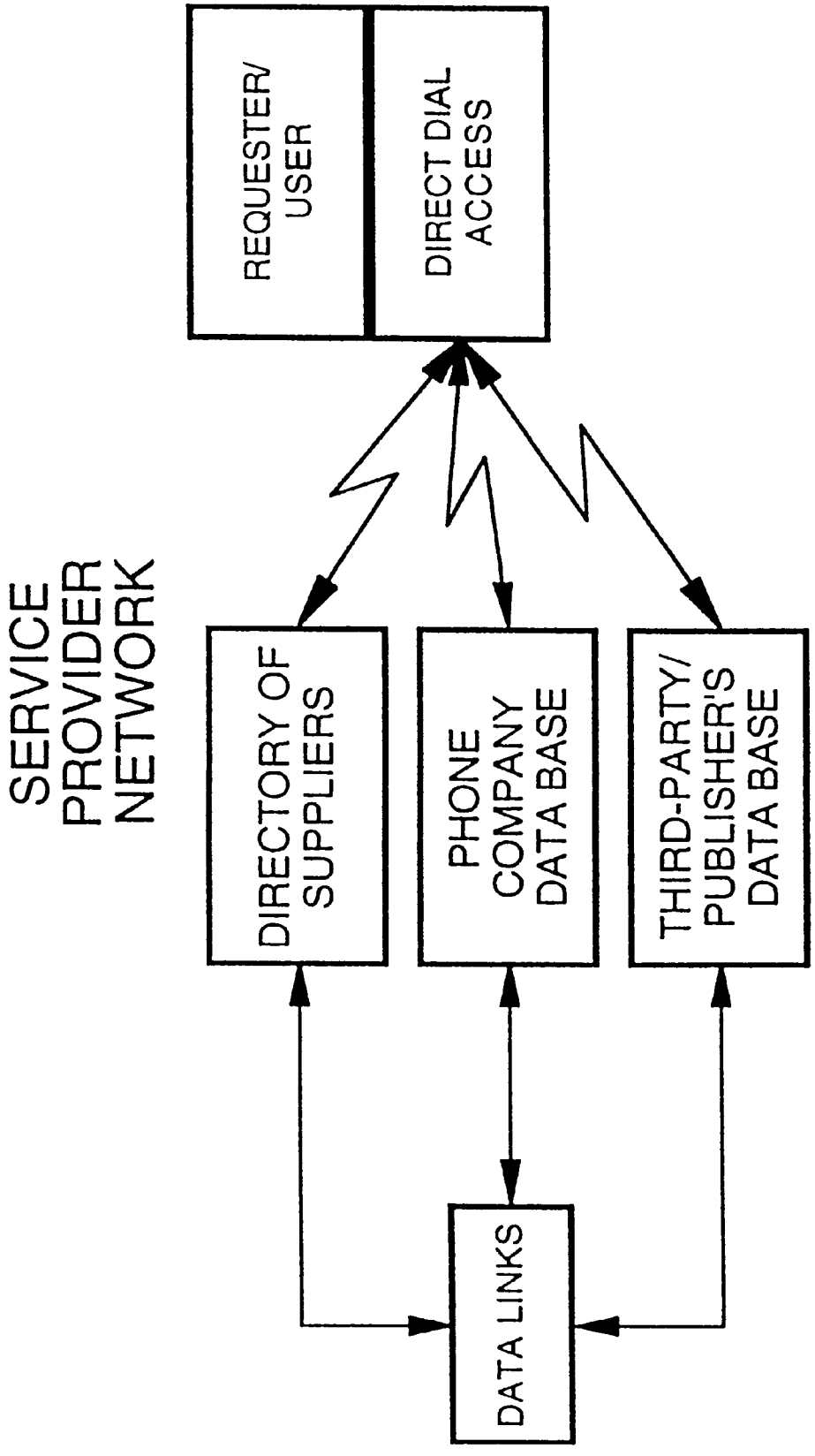

REQUESTER/ USER
DIRECT DIAL ACCESS
SERVICE PROVIDER NETWORK
DIRECTORY OF SUPPLIERS
PHONE COMPANY DATA BASE
THIRD-PARTY/ PUBLISHER'S DATA BASE
DATA LINKS

Fig. 30

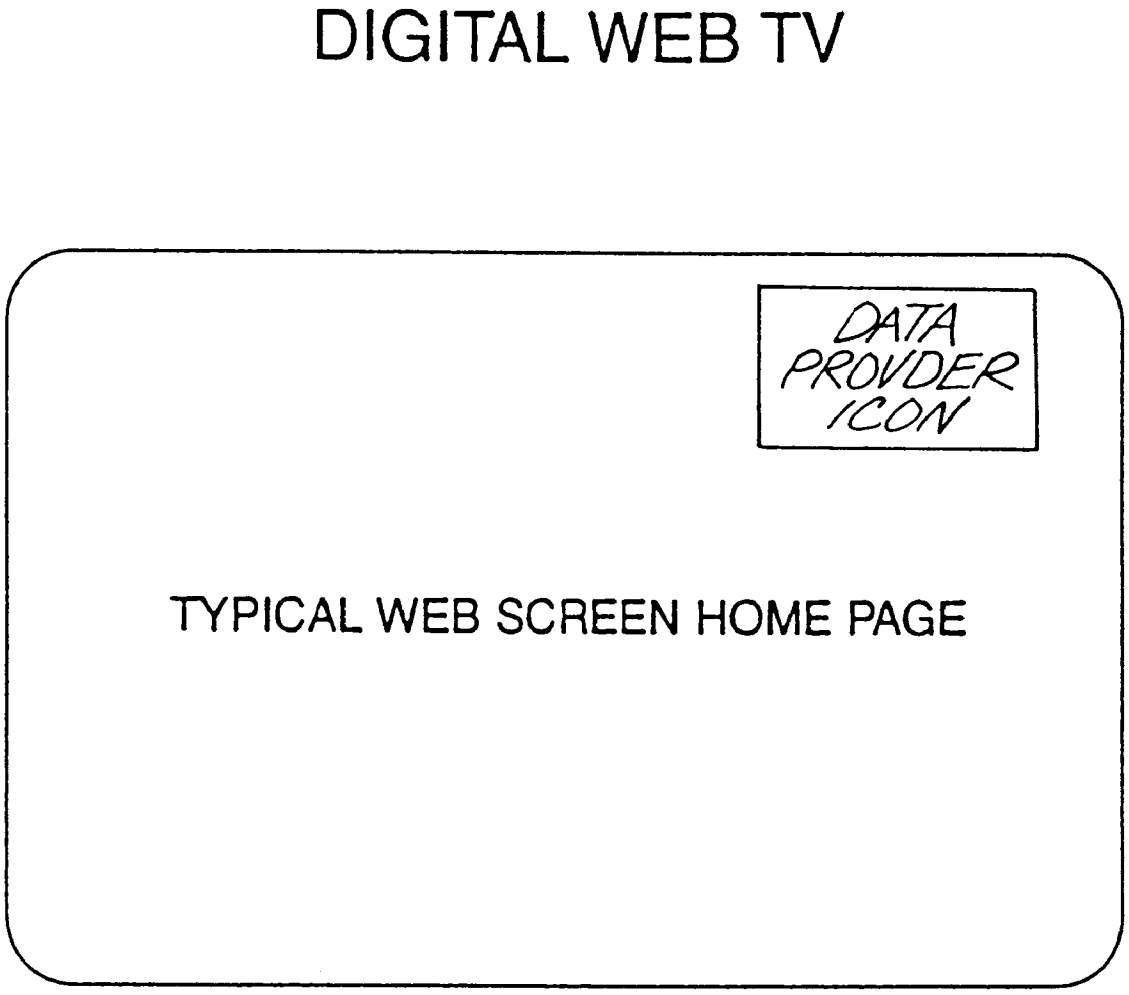

DIGITAL WEB TV
DATA PROVDER ICON
TYPICAL WEB SCREEN HOME PAGE

Fig. 31

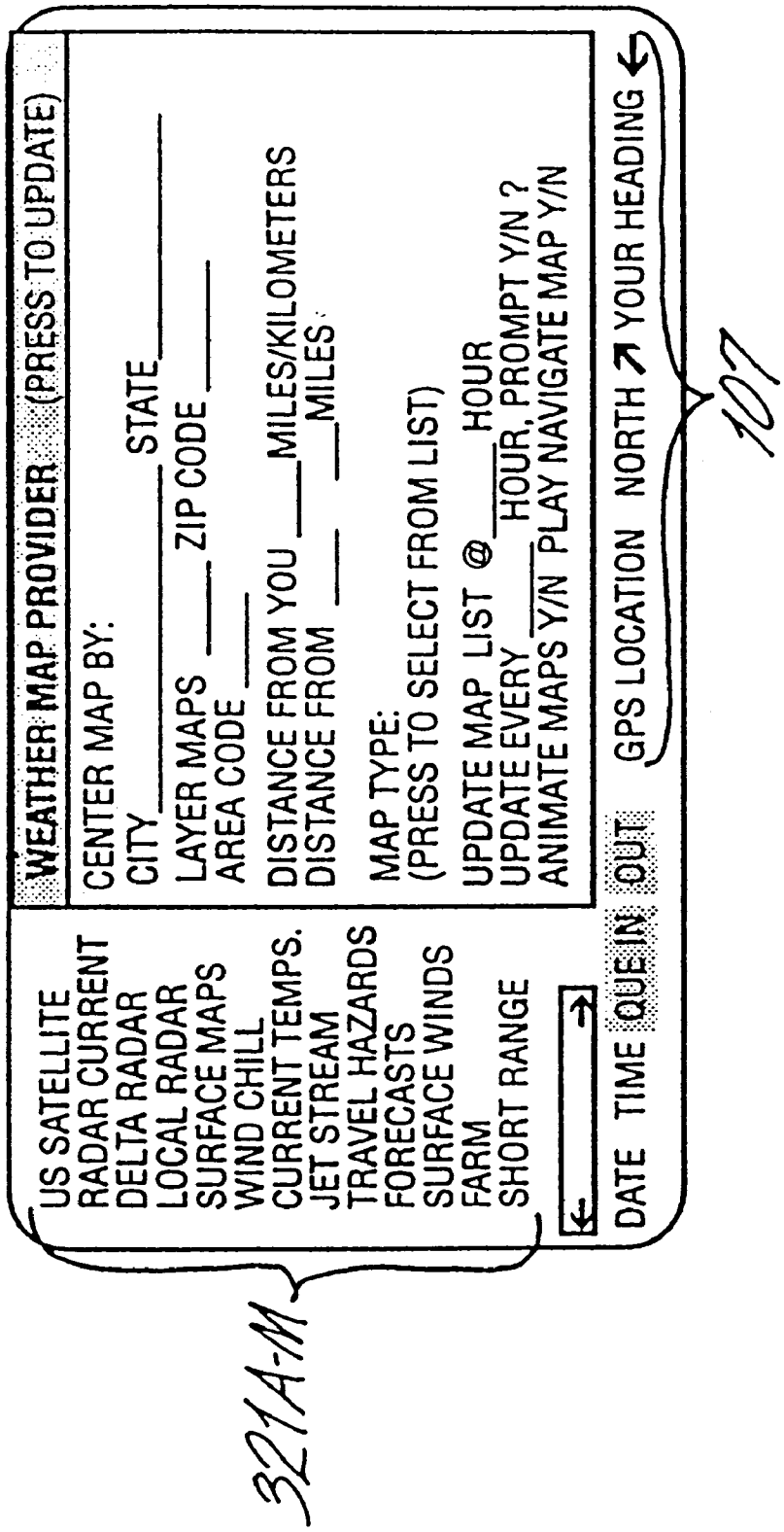

WEATHER MAP PROVIDER (PRESS TO UPDATE)
CENTER MAP BY:
CITY _____ STATE _____
LAYER MAPS ____ ZIP CODE ____
AREA CODE ____
DISTANCE FROM YOU ____ MILES/KILOMETERS
DISTANCE FROM ____ ____ MILES
MAP TYPE:
(PRESS TO SELECT FROM LIST)
UPDATE MAP LIST @ ____ HOUR
UPDATE EVERY ____ HOUR, PROMPT Y/N ?
ANIMATE MAPS Y/N PLAY NAVIGATE MAP Y/N
US SATELLITE
RADAR CURRENT
DELTA RADAR
LOCAL RADAR
SURFACE MAPS
WIND CHILL
CURRENT TEMPS.
JET STREAM
TRAVEL HAZARDS
FORECASTS
SURFACE WINDS
FARM
SHORT RANGE
DATE TIME QUE IN OUT
GPS LOCATION NORTH ↗ YOUR HEADING
3211A-M
107

FIGURE 32

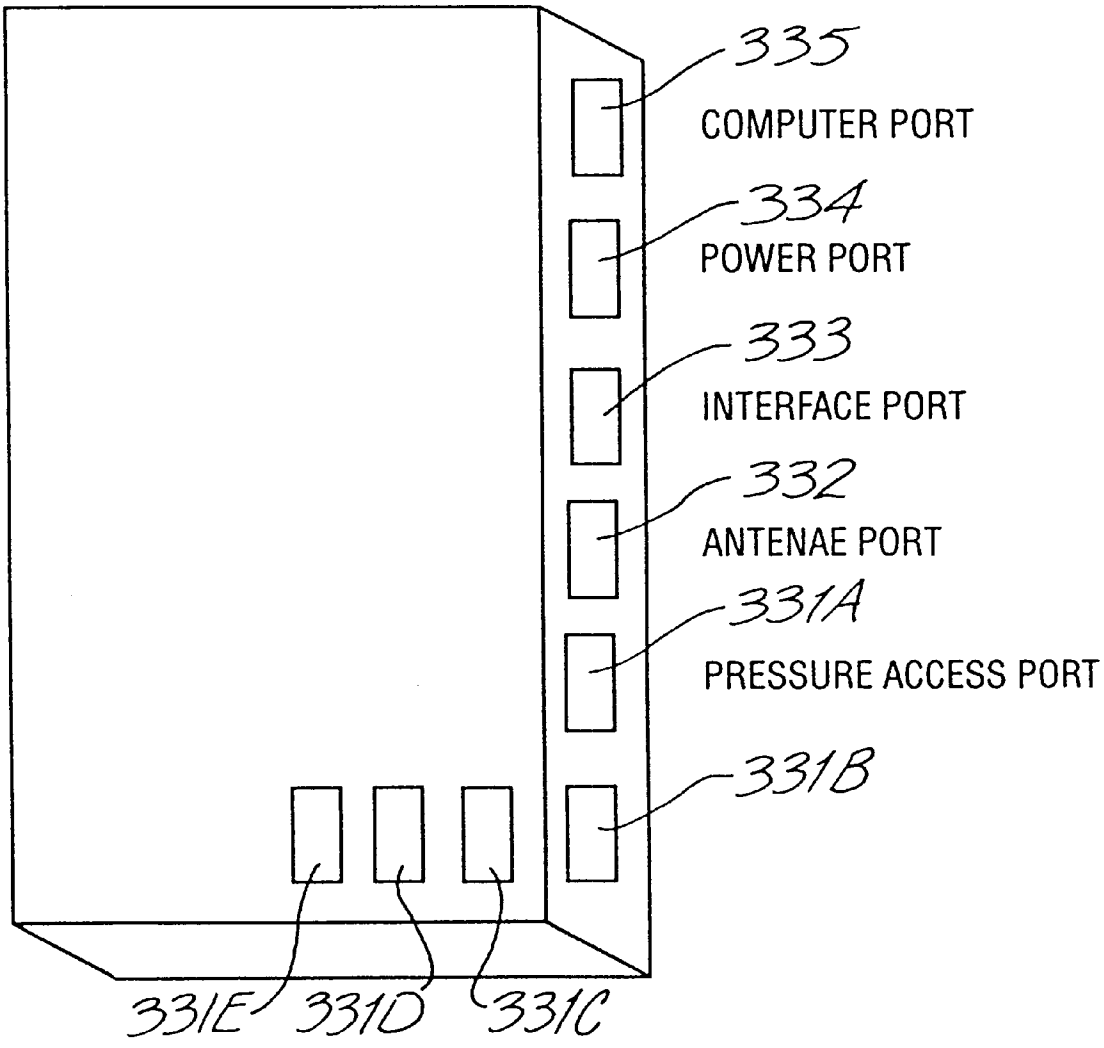

335
COMPUTER PORT
334
POWER PORT
333
INTERFACE PORT
332
ANTENAE PORT
331A
PRESSURE ACCESS PORT
331B
331E
331D
331C

FIGURE 33

PERSONAL COMMUNICATION SYSTEM FOR COMMUNICATING VOICE DATA POSITIONING INFORMATION

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application is a divisional application of U.S. patent application Ser. No. 08/879,955, filed on Jun. 20, 1997 now U.S. Pat. No. 6,148,261 the disclosure of which is incorporated by reference.

FIELD OF THE INVENTION

The invention relates generally to a system for communicating data including global-positioning-encoded information. In particular, the present invention relates specifically to a device and system for communicating and retrieving position and position related data.

BACKGROUND OF THE INVENTION

Availability of up-to-date information is more important today than ever before and this will continue to be true for the foreseeable future. People want to be well informed, so much so that they travel with cellular phones, beepers, and even portable hand-held Global Positioning System (GPS) satellite receivers.

GPS capable devices generally have a GPS receiver for receiving satellite signals from the GPS satellite network that allow for determination of the device's position. Such devices allow for precisely locating the device in terms of latitude and longitude using the GPS receiver. Some devices have map data stored in memory and a display for showing the device position with reference to the map data. Other devices have no underlying map data base for reference. Rather, they show only the geographic coordinates of the device's location. These coordinates may be referred to as waypoints. Most GPS receiver devices can store many waypoints. Some GPS receiver devices can plot and display a trail of waypoints and store this trail for future retrieval. Sophisticated devices may compute the device's heading, speed, and other information based on comparisons with previous GPS determined positions.

GPS receiver devices with map display capability may store the map information on computer diskettes, CD-ROMs, or other computer memory storage devices. The device location may then be displayed on a display terminal with reference to a map stored in the computer memory storage device. The available quantity of map data, however, can overwhelm the memory capability of easily portable computer devices. This problem is exacerbated when additional information is included and linked with the map data. In addition, information is more valuable when it is up to date and available at the time of consumption, and such devices do not incorporate a means for updating the stored information. By way of example, a CD ROM could never maintain an up-to-date list of every 5-star restaurant.

Some GPS receiver devices have the ability to communicate over a telecommunications network. These devices do not provide for automatic or semi-automatic dynamic exchange of on-line position dependent or related information. In addition, these devices cannot communicate with third parties in the absence of a uniform data format standard. For example, a cellular-phone-based system comprising GPS location information working in conjunction with proprietary Public Safety Answering Point (PSAP) telephone equipment is known. The device provides personal

and medical information on an emergency basis to the proper authorities. Such a device does not allow third parties to communicate, tag, interrogate, limit, designate, modify or share this information amongst themselves for any other use.

To that end, the ability to receive digital data structures with GPS encoding, and storing this information for eventual use or broadcast to third parties, would be valuable. Today, the U.S. and several other countries have independent publishers busily GPS mapping everything down to the most minute detail. Most of these data bases are available on CD ROM storage. The problem is that no one data base can contain enough information to fulfill the unique requests of every particular and picky consumer. The costs associated with providing and maintaining such a large data base would be overwhelming and over-burdening. Additionally, most consumers do not like reading or compiling vast data bases.

SUMMARY OF THE INVENTION

The system of the present invention comprises Personal Communications Devices (PCDs), and traditional computer systems with GPS engines, routers, and other application programs to request, process, and transmit tagged GPS encoded information. The system, with related applications, can be accessed by device users, traditional computer users, web-site users (cyberspace), data publishers, public or private enterprises or individuals, by means of application programs. The tagged GPS encoded data files can be stored or sent via communication links using AM, FM, spread spectrum, microwave, laser or light beam in free or fiber optic, line-of-sight, reflected, satellite, secure or non-secure, or any type of communications between multiple points that the application or the state-of-the-art may allow. The system is a waypoint tag and interrogation system using various protocols to answer requests and provide GPS-encoded information. The applications use GPS devices, engines, routing and encoding for access to specific requester-designated data retrieval requests. The applications access fax machines, beepers, telephones and other communication linked devices. The system accesses computer and storage systems with various applications in order to provide this information from a plurality of providers. The system thereby eliminates or reduces the need for large storage devices and interchangeable storage modules.

One embodiment of the present invention includes a requesting device, a data provider (hardware and software), a user, tagger applications or GPS engine and router system with protocols for encoding, tagging, modifying, interrogating, arranging, limiting, displaying, sorting, mapping, segregating, sending, receiving and updating waypoint and the waypoints connected data structures with digital or graphic maps, digital voice files, linked digital web files properly encoded and tagged by way of specific devices, or by traditional computer and storage systems.

The application programs contain protocols for users, providers, taggers, list maintenance organizations, and others, and will use a dynamic identification system from applications containing GPS search engines, route planners, compilers, designators, publishers, and others is to permit communication of information.

The PCD is a cellular-phone-sized electronic device, combining the capabilities of a GPS receiver, transceiver, digital beeper, cell phone and projection system into one compact unit. The PCD is capable of uploading emergency information (medical, police alert, etc.) via a one-push button that phones 911 or a security monitoring center similar to those used for house alarms. The alert continues to be broadcast until a response is made.

The PCD is also capable of downloading information via a request to a data provider, similar to a request for directory information from a phone company or other service. In this mode the PCD acts similar to calling a phone operator for information. However, in this instance, no human contact is required. The caller requests specific information (location of gas stations, names of restaurants, local banks, etc.) via a voice command ("Download e.g., Wells Fargo Banks") or via digital commands using a keypad or other input device and the requested information is automatically downloaded to and stored in the memory of the user's PCD. This information can be accessed off-line via the screen on the PCD. It is all done digitally, eliminating having to write down information such as name, address, location map, GPS latitude and longitude encoding, direction and distance to location, hours of operation, or other items of information. The PCD can be plugged into an automobile input port or similar device, if available, and provide distances and directions to locations of interest. Similar information of a condensed nature can also be provided to the user via the screen of the PCD. The user is not required to be a subscriber to some proprietary system, instead the PCD can use any means to access any data base from any potential provider, whether GPS encoded or not.

In some areas the information would be sent and received by way of a Local Area Broadcast via radio frequency signals to each home, car or PCD within a reception area. In such an embodiment, users are able to access companies listed on the broadcast network from data providers of properly tagged, yellow page-type information or are provided with GPS encoded information and maps similar to web page listings. This would be advantageous to small towns with little information available for travelers, but which have an interest in providing up-to-date traffic, weather and travel advisories to benefit the local community and businesses. Such a system does not require a master, home or base unit. The providers of data base or advertising information could be a single data provider and could also be individual users with application programs that allow provision of such data. The application programs provide a means for sending and receiving data, GPS encoded data and graphics encoded data. The application programs can also act as a universal coder/decoder to other proprietary GPS data bases.

The present invention allows users to request detailed information relating to their present location as well as information related to distant locales. Some of the advantages provided by the invention include:

1. Information can be received digitally by a PCD user from any system.
2. Multiple requests can be retained, stored or resent.
3. In-depth dynamic data retrievals are possible and could be viewed later.
4. GPS tagging and encoding with latitude and longitude information along with encoded maps for navigation.
5. Small non-contiguous map segments are possible.
6. On-line storage of data personal and other information, along with GPS encoded maps on some data files.
7. Display menus, interfaces and applications can be viewed on heads-up display systems in automobiles, homes, businesses and various commercial applications.
8. Allows for portable Internet access.
9. Provides a means for an Internet based telephone directory access tagged and linked to the originating area code and phone numbers.

Remote and distant third parties could communicate with each other and, by sending and receiving GPS encoded data, can meet or find each other in remote locations. Maps and other digital data may be transmitted/received by fax, beeper (receive only), computer, phone and radio.

One embodiment of this invention would include a system of non-subscribers communicating to each other in a similar fashion, without the use of base stations. In addition, the non-subscribers could send personal data bases with maps included, GPS information, and other information of non-related data or graphics from publishers of any such data base. In this embodiment the device would act as a transceiver, sending and receiving dynamic moving waypoint information in digital formats, including maps of various sizes and embodiments.

The PCD can display a singular or a plurality of images and displays, project an image on to a screen or viewing surface, store or communicate data (depicted as a line, graphic, icon, etc.) to and/or receive latitude and longitude data from third parties. Additionally, the device can send/receive latitude- and longitude-encoded maps and other data to/from a third party, send/receive standard or non-standard phone and fax communications (AM, FM, spread spectrum, microwave, laser or light beam in free or fiber optic, line of sight, reflected, satellite, secure or non-secure, or any type of communications between two points that the application or state-of-the-art may allow), perform computer functions from existing application software and operating systems, receive standard or non-standard beeper messages, interface with a conventional computer and provide an interface to a heads-up display, an external viewing device or any projection system.

An embodiment of this invention incorporates a GPS transceiver with a designated application used with a communication system or network. Several users of this invention can communicate and send data, maps and graphic files with or without GPS encoding. By example, a user could request from another party a map of walking trails of Yosemite Valley with latitude and longitude designations properly GPS encoded. This map may not be in the requesting user's data base or in a large number of subscriber's or non-subscriber's data bases. This highly stylized map and encoded information, of a possible non-uniform nature, could be on just one user's PCD device or external source. The requesting user could contact the specialized source for specific information, and be sent via a communication link, the specific data, this data could then be modified by the user and sent back to the original provider.

The preferred embodiment of the PCD and system provides a means for requesting and receiving data files which can be tagged, modified and interrogated. This data can be comprised of many different formats and applications with potentially unique compilations from potentially unrelated, (non)-subscribers or (non)-linked users. These users can communicate with commercial, business and personal computer systems and devices having the capability of running an application (or applications) and having the ability to request and provide waypoint information which can be tagged, modified and interrogated.

Another preferred embodiment of this invention provides a means for decoding tagged, modifiable and interrogatable maps and data files furnished by third parties for display on the user's PCD or traditional computer devices.

In one embodiment of the device and tagging system the GPS information is communicated from locations, homes, businesses, commercial designations, government resources, public and private areas, cyberspace and other

communication systems. Various designated locations, or a plurality and multiplicity of locations, or data structures, are assigned as waypoints. These waypoints could be tagged, or interrogated from an application program which describes, encodes, reports, modifies and communicates this encoded information and data from any location. In addition, the transmitting device may report a plurality and multiplicity of locations or events unrelated to either the location of either the transmitting or receiving device. Indeed, the device could communicate to many unlinked, unreported or unconnected waypoints and send active dynamic information to the requester. Cyberspace providers may enter the network web system, use applications for device communications and participate in the exchange of information using designated GPS engines and applications. By way of example, the invention can provide a requester with dynamic advertisements encoded with maps, location information, or other data to a location anywhere in the U.S. Indeed, tagged files which are linked can be sent from a third-party publisher located in another state.

The system is similar to the world wide web, except the web does not use GPS engines, applications, tagging systems, etc. By way of example, one difference is that the invention uses GPS devices, engines, applications and encoding for access to specific requester designated data retrieval techniques. The invention provides a means to locate specific individuals or places using standard GPS search techniques.

The system includes the concept of storing data, including voice messages. The system encodes files for use in a location tagged data format system. Users can request and compile information and store the information on remote computer systems. Certain protocols for compilation, encoding and tagging data files may be desirable in order to create files for system usage.

An embodiment of the invention uses fax, beepers, telephones, and/or computer and storage systems with application programs to properly GPS encode, tag, modify and interrogate requests and provide same from a plurality of providers. An embodiment of the invention includes applications or GPS engine systems for encoding, tagging, modifying, interrogating, arranging, limiting, displaying, sorting, mapping, segregating, sending, receiving and updating waypoints and its connected data structures with maps, or by any other means by way of specific devices, or by traditional computer and storage systems.

Another advantage the invention provides is a means to display this type of information and a means to store data unrelated to any interrogation by the PCD device. Methods of display include multiple of displays including, by example, overhead displays, heads-up displays, projection systems, LCD displays, computer displays or any past or future designed displays whether connected directly or by some electromagnetic means. The preferred embodiment of the device could include any means of display or combinations thereof. In addition, the device could include many control devices such as remote control, remote mouse type devices and any combination of keyboards.

Further objects, features and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings showing an illustrative embodiment of the invention in which like parts are designated by like reference numerals throughout.

DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a GPS transceiver system and communication links incorporating the present invention;

FIG. **2** is a front perspective view of a PCD of the present invention showing a layout of controls and an initialization screen;

FIG. **3** is a rear view of the PCD of FIG. **2**;

FIG. **4** is a block diagram of the PCD of FIG. **2**;

FIG. **4A** shows a screen menu hierarchy of the PCD of FIG. **2**;

FIG. **5A** illustrates a flow chart depicting the program sequence for the entry of a personal identification number (PIN) and personal data into the PCD of FIG. **2**

FIG. **5B** illustrates a flow chart depicting the program sequence for the user to select a mode of operation using the PCD of FIG. **2**;

FIG. **5C** illustrates a flow chart depicting the program sequence for the user to control the GPS mode of the PCD of FIG. **2**;

FIG. **5D** illustrates a flow chart depicting the program sequence for the user to control the phone mode of the PCD of FIG. **2**;

FIG. **5E** illustrates a flow chart depicting the program sequence for the user to control the computer mode of the PCD of FIG. **2**;

FIG. **5F** illustrates a flow chart depicting the program sequence for the user to control the radio mode of the PCD of FIG. **2**;

FIG. **6** illustrates the Main Menu page of the PCD of FIG. **2**;

FIG. **7** illustrates the select GPS Function page of the PCD of FIG. **2**;

FIG. **8** illustrates the GPS: Location page of the PCD of FIG. **2**;

FIG. **9** illustrates the GPS: Show Me page of the PCD of FIG. **2**;

FIG. **10** illustrates the GPS: Get Map page of the PCD of FIG. **2**;

FIG. **11** illustrates the GPS: Third Party page of the PCD of FIG. **2**;

FIG. **12** illustrates the FAX page of the PCD of FIG. **2**;

FIG. **13** illustrates the Beeper page of the PCD of FIG. **2**;

FIG. **14** illustrates the Phone page of the PCD of FIG. **2**;

FIG. **15** illustrates an Information Request page of the PCD of FIG. **2**;

FIG. **16** illustrates the Computer page of the PCD of FIG. **2**;

FIG. **17** illustrates the Radio page of the PCD of FIG. **2**;

FIG. **18** illustrates the Receive Queue page of the PCD of FIG. **2**;

FIG. **19** illustrates the Send Queue page of the PCD of FIG. **2**;

FIG. **20** illustrates a typical listing downloaded from a data provider;

FIG. **21** illustrates a typical GPS encoded map downloaded from a data provider;

FIG. **22** illustrates atypical GPS encoded map with waypoints locating restaurants within a specified radius;

FIG. **23A** illustrates an exemplary data provider;

FIG. **23B** illustrates an exemplary configuration of a non-PCD computer utilizing a modified application module;

FIG. **24** illustrates a software module configuration of a requester;

FIG. **25** illustrates a software module configuration of a provider,

FIG. **26** illustrates a software module configuration of the application module;

FIG. **27** illustrates a software module configuration of the tagging system;

FIG. **28** illustrates a software module configuration of the GPS engine;

FIG. **29** illustrates a software module configuration of the universal translator;

FIG. **30** illustrates a typical configuration of the service provider;

FIG. **31** illustrates a possible configuration of the digital web TV;

FIG. **32** illustrates the Weather Map Request page of the PCD of FIG. **2**; and

FIG. **33** illustrates a weather reporting device.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** shows a system capable of communicating using the electromagnetic energy spectrum, traditional computer networks, cellular phone networks, public telephone networks, and satellite system networks. The major components of the system comprises personal communication devices (PCDs) **20** and one or more of the following: a cellular phone network **60**, a standard phone line network **70**, an electromagnetic energy spectrum network **80** and/or a computer network **90**. The PCD receives signals from a GPS satellite system **10**.

FIG. **2** illustrates a PCD of the present invention. The PCD has a display **28***a*. The display may be of a LCD type or other types known in the art. Incorporated with the display is a touch screen input device **28***b*, which are known in the art. The PCD also has a alphanumeric key pad **26**, which includes many of the standard keys generally found on computer keyboards. The location of the keys, and the selection of the characters used on a single key, may be varied as desired. The PCD also has specialized keys **27***a–g*, n related to GPS, telecommunications, and other functions. Located on one side of the PCD are a number of input and output ports. In the embodiment shown, these ports include a modem output port **29***g*, a generalized communication port **29***f*, a power port **35***b*, an infrared port **29***e*, and a heads-up display interface port **25***k*. The location of these ports are shown for descriptive purposes only, the specific location of these ports on the PCD is not critical. The power port allows the PCD to be operated from an external power source (not shown). The communication port allows the PCD to be connected to printers, local computer networks, and the like.

FIG. **3** shows a rear view of the PCD of FIG. **2**. The rear of the PCD contains a microphone **34** towards one edge of the rear of the PCD and a speaker **33** towards the opposing edge. The layout of the microphone and the speaker is similar to that found in portable cellular telephones. An antenna **32** extends from the edge near the speaker to allow for communication in a cellular telephone network or via other electromagnetic spectrum means. The PCD contains a battery **32***a*. The battery allows for mobile operation of the PCD and is the selected power source if an external power source is not available through the power port. The PCD's operation is governed by a processor **21**. A variety of microprocessors may be used, with the selection of such determined by processing power, power utilization, and other factors and requirements. The PCD has a slot **23** for a PCMCIA card, CD-ROM, or other computer accessory. The PCD is powered on when the power button **31** (shown in FIG. **2**) is depressed. In the embodiment shown, at initial device power on, the processor causes the PCD to display the initialization screen **100** (shown in FIG. **2**).

FIG. **4** shows a block diagram of the PCD. Control and logic functions are performed by the processor **21**. Internal data storage **22**, which is provided by conventional memory such as RAM or ROM or variations thereof, may be accessed by the processor. The processor may also access removable data storage devices **23** such as a hard disk installed via the PCMCIA slot, a CD-ROM type device or other similar removable data storage devices. The processor is connected by a data bus **24** to a number of devices. These include the alphanumeric key pad and other special purpose keys, the touch screen, and other hard wired input devices. The heads-up display output port and the display screen are also connected via the data bus to the processor, it being recognized that a number of display related devices such as VGA cards, chips, and the like are also required to implement the display device functions and the other previously mentioned functions. The microprocessor may also access or control communications with telephone networks, either hardwired or cellular, radio transmissions, infra-red transmissions, or communications with other computer devices.

All known verbal commands from GPS systems can be implemented and attachment or inclusion of voice activation for map instructions relative to location, GPS and street designations, including heading descriptions, distance, and arrival time estimates can be included.

FIG. **24** illustrates a block diagram of the PCD's software components. An application module or program **51** interfaces with the PCD's operating system **241**. The operating system may be DOS, UNIX, Windows 95, Windows NT, O/S2 Apple McIntosh, Next Computer, or other operating systems, including operating systems well suited to devices with constrained memory or other limitations due to the small physical size of the PCD. The operating system additionally interfaces with other application programs **242** that provide standard file edit and other functions typically found in personal computers. The operating system, or other application programs interfacing with the operating system, provide for maintenance of data bases **245** used by the PCD. The application module includes a GPS engine **53** providing GPS functions, including interfacing with the GPS receiver **243** (shown in FIG. **4**). A query menu program **54** of the application module controls the graphical user interface and related functions for the device. Included in the application module is a universal converter **55**.

As illustrated in FIG. **29**, the universal converter enables the PCD to read in data provided by third parties **291***a, b* and convert or filter such data to a format useable by the PCD. The universal converter first inspects the received data to determine if the data is in a known format which can be converted to the format used by the PCD. If the format is not known by the device, the universal converter attempts to extract any ASCII data or format the data as a bit map as appropriate.

As illustrated in FIG. **26**, the application module further includes programs to implement data formatting and communication protocols using header protocols **271**, layer protocols **272**, and data provider protocols **273**. The application module also includes a tagging system interface program **274**. The elements of the tagging system are illustrated in FIG. **27**. The purpose of the tagging system is to provide a common universal data structure for requests and responding to requests. Various techniques common in

the GEO coding industry, using U.S. Census bureau data and tiger files with certain modifications, can establish parameters for software suppliers to use latitude and longitude encoding as coordinate pairs, postal code encoding and street centering encoding, all for the benefit of accuracy in designating certain files as "tagged". The tagging system provides the ability to apply and strip header and layer information to and from data files.

FIG. **4**A shows the top level page menu display hierarchy of the PCD. At initial power on the initialization page **25***a* (shown in FIG. **2**) is displayed. The initialization page allows for the entry of a personal identification number and other data. Depressing the home button **27**E (shown in FIG. **2**) displays the Main Menu page **25***b*. A number of additional pages are available from the Main Menu page. These include the GPS **25***c*, Fax **25***d*, Beeper **25***e*, Phone **25***f*, Computer **25***g*, Radio **25***h*, Send Queue **25***i*, and Receive Queue **25***j* pages.

FIG. **5**A lists a sequence for the operator of the PCD to answer certain questions, provide information for future access regarding handling of emergency events and handling of same by civil authorities or private individuals empowered to act on behalf of the operator. Access is denied or provided based upon user codes. The entry of a user code may allow for limited to full access of the data stored in the device and usage of same with different codes providing different levels of access and usage. Similar information and sequencing is provided by the application modules and operating system for medical and other information in the event of emergencies. In one embodiment of the preferences screen (not shown) information can be displayed in a specified manner, events recorded and equipment options listed. Specific usage of the device and furnished software would be recalled by each user having access and user codes to operate the PCD, each user having unique individual screens and setups based on that user's preferences. The initial setup of screen preferences and other user configuration details are well known in the art.

Selecting PIN **111** from the Main Menu page displays a screen **113** prompting the user to input a personal identification number. Using an alphanumeric key pad **26**, the user inputs a personal identification number and presses ENTER **27***g*. The processor analyzes the entered personal identification number and determines if the number is valid **115** FIG. If the entered personal identification number is valid the processor enables PERSONAL **121**, MEDICAL **131**, PREFERENCES **141** touch points on the display screen. These touchpoints, and touchpoints later referred to, are selectable either by pressing the display screen at the touchpoint location or by selecting the underlying display item with the cursor. If the PCD already contains personal, medical and preference data, the HOME button **27***e* is enabled. If the personal identification number is not valid, the processor **21** will increase the device security level **119**. This may include, but is not limited to, disabling the PCD operation for a specified time. Selecting PERSONAL **121**, MEDICAL **131** or PREFERENCES **141** touchpoints displays the corresponding pages **123**, **133**, or **143**. These pages request specific data, and allow the user to input data using alphanumeric key pad **26**. Completion of data entry is indicated by pressing the ENTER button **27***g*.

In addition, the Initialization page **100** FIG. **2**, as well as all other pages, displays the time and the date **103**, touch points for QUE IN **550** and OUT **600** (described later in this document) and limited GPS information **107**. The limited GPS information comprises of the user's location (latitude and longitude), an arrow pointing to north and an arrow indicating direction of device travel.

When enabled, pressing the HOME button **27***e* (FIG. **2**) signals the processor to display the Main Menu page **150** FIG. **5**B. As shown in FIG. **6**, the Main Menu page allows the operator to use the touch screen to select the GPS **200**, FAX **300**, BEEPER **350**, PHONE **400**, COMPUTER **450**, RADIO **500**, RECEIVE QUE **550** and SEND QUE **600** touchpoints. The heading and directional information are displayed in real time and are dynamic. Pressing the FAX touchpoint causes the processor to display a Fax page (shown in FIG. **12**) which lists received facsimile messages **301**. The Fax page includes display interfaces appropriate for the sending and receiving of facsimile communications through the FAX Phone Modem port **29***g*, and such displays and functions are well known in the art. Pressing the BEEPER touchpoint causes the processor to display a Beeper page (shown in FIG. **13**). The Beeper page displays received beeper messages **351** and allows for the deletion of such messages from the display and internal memory storage. Also, a sub-menu portion of the display **151** is reserved for sub-menus and directories.

Pressing GPS **200** causes the processor **21** to display a GPS Function page **201**, which is illustrated in FIG. **7**. The GPS page provides for selection of a GPS mode through touch points in the sub-menu portion of the display. The available modes are location **210**, show me **230**, get map **250** and third party **270** modes. The display returns to the GPS Function page when the PREVIOUS button **27***i* (shown in FIG. **2**) is pressed. The display hierarchy for the GPS functions is illustrated in FIG. **5**C. The Location, Show Me, Get Map, and Third Party pages descend from the GPS Menu page. The Location page comprises the current map, the location on the map of the device, and a plot of the trail of the device on the map. The sub-menu portion of the display provides for additional selection of still further pages. These pages include a Menu page, a Mode page, a Waypoint page, and a Preferences page.

The Location page is illustrated in FIG. **8**. The Location page includes a GPS map **219** (latitude and longitude encoded coordinate pairs). The sample page shown is an encoded map showing the device position, plot trail and the encoded map location of the selected waypoint. The map displayed could be from on-board memory or sent by other third parties by way of communication links to the PCD. When map data files are encoded with location information, the location information can be referred to as waypoints. These tagged waypoints, with links to other data structures, can then be sent to users via an application to various communication systems. Closed-loop or proprietary GPS receivers can send/receive data to/from other third parties (Brand X, Brand Y) via their own proprietary format using an application system as a universal converter. The location information is dynamic and updated periodically by the PCD's communication system via link-up with GPS-based satellites. The Location page indicates the PCD position **801**, indicated by a walking person, as being located on a highway **810**. A waypoint **802** is along the highway en route to the desired destination address **803** located on a local street **804** which intersects the highway. A first point of interest **807** is also displayed as being along the highway, as is a second point of interest **805** along a second local road intersecting the highway. The limited GPS information, providing location, heading and north, is also displayed. The illustrated Location page display shows only one possible combination of a map layout. Other display sequences such as North up, course up, user at top of screen, user in middle, and other display sequences are possible. The dynamic nature of the PCD allows the PCD to display GPS encoded maps as the PCD progresses dynamically with relation to the maps.

Using interpolation techniques, performing spatial query analysis, and establishing layers for best display scale for any given map record allows the device to provide the user extended capability not possessed by traditional GPS devices. Applying various protocols and interpolation techniques allow files to be arranged geographically by distance from a designated point (usually the requesters latitude and longitude as the starting point, but other locations may also be used). The maps are also arranged in layers, menus, limited, listed, showed, displayed, and sorted.

The Location mode provides typical GPS system functions. The touch points MENU **213**, MODE **215** and WAYPOINT **217** and PREFERENCES **221** provide access to the Menu, Mode, Waypoint, and Preferences pages. These pages, along with various buttons on the alphanumeric key pad **26** FIGS. **2** and **4** and special function buttons **27**, are used to configure the display to the user's preference. The preferences page **221** enables selection of such features as voice, maps, scroll, off screen maps away from cursor and other features. The listing name **219** portion of the Location page displays information pertaining to a waypoint selected through the use of the cursor.

FIG. **9** illustrates the Show Me page accessed from the GPS page. The Show Me page shows a list of available maps **901***a–i* stored on-board, which includes maps retrieved from the receive queue area of the PCD memory. The user can load a map into the location or third party pages by pressing the corresponding number key on alphanumeric key pad **26** (shown in FIG. **2**) or by scrolling through the list to highlight the appropriate map and then pressing ENTER button **27***g*. Maps may also be removed from on-board storage using the DELETE button **27***h*.

FIG. **10** illustrates the Get Map page accessed from the GPS Menu page. The user of the PCD can request the map by location from PCD memory or an external source. The user may enter a desired map location. If a map location is entered, the PCD will only search PCD memory for a map for the entered location. Maps from an external source are downloaded via any of the communication links such as the FAX, BEEPER, PHONE or RADIO touchpoints provided in the sub-menu portion of the display **151**. Depending on the users requirements, several maps could exist showing similar map areas with different layers for viewing. By way of example, airport maps with air space requirements, coastal waterway, maps, and interstate maps, and even hand drawn maps scanned into a computer system all show different resources within a given geographic area. These maps, when presented on the PCD, could over-saturate the display map detail for any given map area. Therefore, it is preferred that the actual map displayed be selectable. Maps are retrieved by pressing QUE IN **550**, scrolling to highlight the desired map, and pressing ENTER **27***g* FIG. **2**.

FIG. **11** illustrates the Third Party page accessed from the GPS menu page. The Third Party page provides an interface to communications with a third party through touch points in the sub-menu display **151**. In the display shown, a user can receive a third party's data and GPS encoded map for viewing on the device or save it for future usage. The user can also dynamically track the third party by periodically having the third party send updates via normal communication links. The third party location can be displayed on maps dynamically sent by map publishers, maps already on-board (furnished at some earlier date), or on maps sent by the third party. The PCD plots and interpolates the GPS data sent by the third party and places an icon **951** (GPS latitude and latitude coordinate pair) on the displayed map using spatial query analysis techniques performed by an application module. The information received from the third party may be other than maps or GPS encoded information, but may be information of any type. The data is received from the third party using phone **400** and radio communication links **500**. A PREFERENCES touch point **274** enables entry of items such as phone numbers for automatic call back and time interval for automatic transmission of information. If the radio, a satellite phone, or other frequency based communications link is utilized, the PREFERENCES touch point allows entry of frequencies for use for automatic transmission of information. A split screen displays the user's location on a map on the left side of display **272** and, after contact with a third party via a communication link, the third party's map and location on the right side of display **273**. If the third party's location is sufficiently close to the user's location, or if the user's displayed map covers a sufficiently large area, both the user's and third party's location can be shown on the same map without resort to a split screen display.

FIG. **32** illustrates a Weather Map Request page. The Weather Map Request page is accessed by pressing the Weather button **27***n* (shown in FIG. **2**) on the PCD. The Weather Map Request page allows the PCD user to specify the map location and scale, the map type, whether the selected map should be automatically updated at specified intervals, and whether a set of maps should be displayed in a sequential fashion. The PCD displays a number of different types of weather maps, including satellite images, radar maps, temperature maps, wind chill maps, and any other type of weather map available. Some weather information is more perfectly provided by showing a sequence of displays indicating the change in weather over time. Therefore, the PCD allows the operator to sequentially display a set of maps, thus providing an animated map display.

FIG. **33** illustrates a weather reporting device. The weather reporting device has a power port **334** to provide electrical power to the weather reporting device. As with the PCD, the weather reporting device may also be powered by a battery (not shown). The weather reporting device also has a computer port **335**, an interface port **333**, an antenna port **332**, a pressure access port **331***a*, and a number of auxiliary ports **331***b–e*. The computer port provides a communications interface to a standard personal computer or the PCD. The interface port provides an interface to systems with weather detection features, such as aircraft with weather radars or lightning strike finders. The antenna port allows an external antenna to be connected to the weather reporting device, thereby providing remote operation capability. The pressure access port provides external access for an internal pressure sensitive device (not shown) for the determination of barometric pressure. A plurality of auxiliary input ports **331***b–e* provide an interface for connecting the weather reporting device to external weather detection sensors such as temperature sensors, wind sensors, and other weather sensing devices.

The Fax page is accessed by pressing the FAX touchpoint on the Main Menu page. FIG. **12** illustrates the Fax page. The sub-menu portion of the display is available for listing previously stored phone numbers. These phone numbers are selectable as a facsimile destination. In addition, the user can directly enter the phone number to indicate the facsimile destination. As with other pages, the PCD continues to dynamically display the limited GPS information of location, north and heading. The PCD facsimile function is performed by application software executed by the processor. Multiple fax locations, time set, send after certain time, and other traditional functions of fax machines and their

implementation are well known in the art. The Fax page provides for display of a message (not shown) entered via the alphanumeric key pad **26** (shown in FIG. **2**) or through selection of messages stored in the send queue area of device memory. Messages stored in the queue area of PCD memory can be selected by scrolling through a directory **305** of all fax messages stored. To view a stored message the user uses the SCROLL button **27***a* (shown in FIG. **2**) to highlight an entry, and then press ENTER button **27***g*. Pressing the SEND button **27***b* transmits the selected or entered facsimile. The user may also view received faxes using this mode by pressing QUE IN **550** FIG. **12**, using the SCROLL button **27***a* to highlight the desired message, and pressing the ENTER button **27***g*.

The Beeper page is accessed from the Main Menu page. Pressing the BEEPER touch point on the Main Menu page causes the processor to display the Beeper page. The device contains capabilities consistent with common practices of beepers, also known as pagers, such as sending and receiving messages. These functions and their implementation are well known in the art. The PCD is also satellite communications capable. Beeper messages can be received by the PCD without interference to the other device capabilities. Therefore, the user could continue using the telephone or other features seemingly uninterrupted by the reception of digital beeper messages and display of those messages. The Beeper page provides a list of beeper messages (not shown) stored in the receive queue area. Messages stored in the receive queue can be selected by scrolling through listing **353** FIG. **13** of all beeper messages stored. To view a stored message, the user uses the SCROLL button to highlight a desired message and presses the ENTER button **27***g*. Messages are deleted when the DELETE button is pressed with at least one message selected.

The Phone page is illustrated in FIG. **14**. The Phone page is accessed from the Main Menu page. Pressing the PHONE touchpoint on the Main Menu page causes the processor to display the Phone page. The Phone page is also accessed by pressing the PHONE touchpoint on the Get Map and Third Party pages. As with the other pages, the limited GPS data is continuously displayed showing PCD location, heading, and north. The PCD can access several areas of the display even while the PCD is being used as a telephone. Information provided in the display area **1401** will vary depending upon the page from which the phone page was accessed. The Phone page provides for selection of a function through touch points displayed in the sub-menu portion of the display. The selectable touchpoints are: POLICE **403**, MEDICAL **405**, DATA PROVIDER **407**, DIRECTORY **413**, and MEMORY **415**.

When the POLICE touchpoint is pressed, the PCD places a call to emergency 911. The 911 telephone number is the default, another number could instead have been entered for any particular user through the preferences selection. Once the telephone call is answered, the PCD provides the information entered using the Preferences function and the device location. The user may also establish voice and data communications through the microphone **34** and speaker **33** (shown in FIG. **3**).

The PCD performs equivalent functions when the MEDICAL touchpoint is pressed. As different phone numbers and information can be entered in the selection of user preferences, however, different phone numbers may be used and different information may be transmitted.

When the DATA PROVIDER touchpoint is pressed, the processor displays the Data Provider Connect page. The Data Provider Connect page provides a means to specify the type and amount of data to be downloaded from a specified data provider. The Data Provider Connect page has numerous data fields which are selected by use of the cursor. Once a field is selected, the user may enter data in that field using the alphanumeric keys. The data fields include data for name, city, state, map area, zip code, telephone area code, retail category, distance from device location, and maximum number of listings to be provided by the data supplier. Whether a map only is requested and what particular types of maps, such as interstate maps, walking area maps, zip code maps, street maps, area code maps, or state maps, are requested are also provided as options. Touch points for weather information and traffic reports are also provided. Once the appropriate data fields and/or type of data required is input or selected, pressing the send key transmits the data request to the data provider. Details regarding the method of transmission of the responsive data is automatically sent by the data provider to the data provider along with the data request.

The primary data providers may include the public telephone company networks but may also include other entities. The data providers maintain data, including maps, telephone yellow page entries, and other information such as traffic and weather reports. This information is maintained in a timely manner and is accessible through the use of data base methods well known in those in the art. Upon receiving a request for data, the data provider determines the nature of the data request, searches the appropriate data base or data bases, and transmits the requested information to the requesting device in the manner specified by the requesting device. The user, after the PCD receives the data as requested, disconnects, goes off line to review the information, deleting some, saving others, and storing other encoded information on the PCD. The user can now further edit the device's entire data base and decide a sequence for navigating to the locations listed in the various menus as waypoints. Thus users of the PCD can decide to navigate using the GPS features of the PCD and select certain waypoints and the order in which to proceed. By way of example, but not limited to same, users could select gas stations, banks, restaurants, shopping centers in unfamiliar areas, navigate today from one point of beginning and tomorrow continue navigating from another point of beginning, being assured that the device will always know how to get to various locations. Should the user require further locations to visit, the PCD is capable of obtaining new navigational data and adding to the already active route plan without having to completely start over.

Pressing the DIRECTORY touchpoint **413** displays an alphabetical listing (not shown) of phone numbers stored on-board. The user may scroll through the listing and select a desired phone number. Pressing MEMORY **415**, displays an alphabetical listing (not shown) of frequently used phone numbers. The user may scroll through the listing and select a desired number. Pressing the SEND button causes the device to dial the selected phone number.

FIG. **16** illustrates the Computer page. The Computer page is accessed by pressing the COMPUTER touchpoint **450** (shown in FIG. **6**) on the Main Menu page. The Computer page allows the user to operate the device as a standard personal computer utilizing application programs of the type normally present on personal computers. As examples, the display of FIG. **16** provides for touchpoints in the sub-menu portion of the display for calendar date entry, notes, and organizer application programs. As with the other pages, the limited GPS information is also displayed.

FIG. **17** illustrates the Radio page. The Radio page is accessed by pressing the RADIO touchpoint **500** on the Main Menu page. The radio mode provides the user with an interface for selecting the type of radio signal through touch points displayed in the sub-menu **151** area. The selectable types are: AM **503**, FM **507** and TRANSCEIVER **511**. Selecting any type will display a page (not shown) requesting frequency, volume, and other parameters relating to radio transmission and reception. The AM and FM are standard receivers. The device can thereby tune and listen to broadcasts that provide data links and receive data files using legal AM or FM radio bands (or any other radio band legal to access and provide radio station information). The device therefore allows users to communicate information amongst themselves without having to rely on telephone technology. This is especially valuable when telephone technology is not available.

The Receive Queue page displays stored received messages. The received messages may be displayed by reception type through selection of the transmission line type listed in the sub-menu portion of the display, the selectable types, through touch points displayed in the sub-menu **151** area, are: ALL **553**, FAX **555**, BEEPER **557**, PHONE **559**, COMPUTER **561** and RADIO **563**. Selecting a type, will sort (by specified type) and display (by date and time) all messages received. By way of example, the radio queue contains GPS-encoded voice mail or digital files (containing information to various sites) provided by private third-party sources. The phone system queue contains previous calls with digital messages linked to web pages containing voice and video data. The computer which may be queued contains personal letters, calendars, notes and the like from more traditional sources or user created tagged files for storage. The fax queue contains traditional faxes which may illustrate maps with waypoints. The beeper mode queue contains received beeper messages (digital and voice).

The Send Queue page is accessed by pressing the SEND QUE touchpoint on the Main Menu page. The Send Queue page includes similar functions as the receive queue, except the Send Queue is a staging area for sending messages. The Send Queue page displays sent or to-be-sent data and an interface for selecting the specific type of queue. The selectable types, through touch points displayed in the sub-menu portion of the display **151**, are: ALL **603**, FAX **605**, BEEPER **607**, PHONE **609**, COMPUTER **611** and RADIO **613**. Selecting a type, will sort (by specified type) and display (by date and time) all messages sent or waiting to be sent.

FIGS. **23**A and B are a system block diagram including a block diagram of a data provider. A plurality of PCDs **231**, **232**, **233** communicate with each other using the aforementioned communication means. The PCDs also communicate with various data base information suppliers including private data base information suppliers, publisher data base information suppliers, telephone service data base information suppliers, and a data base provider. The data base provider receives digital requests for map information or other data regarding a geographic area. The data provider collects map data and other data and tags the other data to the map data and maintains the map and location tagged data in a data base. Human intervention is not required in responding to data requests.

As shown in FIG. **23**B, the application module of the device is ported to a computer system not GPS capable, or merely not portable so as to have no need for a GPS receiver. The application module allows non-PCD based computer users to provide data to the data provider in the correct format, as well as receive data from devices or the data provider. This allows the non-device base computer user to track the location of devices and to collect information to be manually entered into a traditional GPS capable device as an aid in future trip planning.

FIG. **20** illustrates a list of GPS encoded data for a restaurant listing of restaurants in a requested area. This list may have been furnished by third parties or a data provider. The PCD has stored this information in digital format and is displayed on a GEO coded map, GIFF map or any other map the PCD stored in memory or receives from a third party or data provider. The information can be arranged by the PCD using criteria enabling the user unlimited access to the data. If the user chooses to navigate to these locations singularly or as a group, the GPS engine performs these functions, allowing a user of the device to accurately travel to the desired restaurant. As shown in FIG. **21**, the PCD can use any scale of map or combinations and other types of maps as shown. The user of the PCD selects certain maps for storage and recalls same when needed for navigation. By way of example, the user's device could have a local Los Angeles street map, an interstate map (as shown in FIG. **21**), and a New York city map in device memory. The user could navigate to the airport using the GPS functions and stored Los Angeles map, fly to New Jersey, rent a car and navigate to New York using the interstate map and, finally, find a specific restaurant in New York City by using the third map stored in PCD memory.

As shown in FIG. **22**, the PCD contains a map with various waypoint locations the user has selected. These waypoints are both standard waypoints **221** and linked waypoints **222**. The waypoints are indicated by a marker on the display. Standard waypoints indicate identifiable locations of interest. Linked waypoints have additional data associated with the waypoint. The additional data may be text data, visual data such as a photographic image of the waypoint, or an audio data file. When the marker for the linked waypoint is selected using the touch screen or other input device, the processor determines if the additional data associated with the waypoint is available in the PCD memory. If the additional data is not available in the PCD memory, the PCD automatically requests the additional data from a data provider. Once the additional data is available, the PCD displays or otherwise makes use of the additional data.

Using the map of FIG. **22**, the user could navigate to a school, restaurant, bank, gas station, government office using the PCD to interpolate using spatial query techniques to find the best routes to each location. The PCD can re-collate the list for the most efficient route using the application and GPS engine modules. Using software programming techniques and math formulas, persons skilled in the arts will utilize spatial analysis queries and functions to determine best routing and "closest to" scenarios. In addition, centroid interpolation functions and match-rate comparison functions used by the GEO coding community will further enhance this application's ability to universally communicate with other systems.

FIG. **30** further illustrates a system whereby the user uses a PCD to dial a direct access number similar to dialing 411, but all requests are requested and serviced automatically. Upon connection to the system, the user makes keyboard requests to the PCD or traditional computer system using the application program of the PCD. Upon requests being received by the data provider or similar information provider, the provider or supplier searches the data base for data responsive to the request. The provider or supplier can

access further data through data links to other third party sources and continue to provide all data required by the requester. This system is consistent with the world wide web, linking data through hypertext connections and designations. This invention's system converts information requests to data requests, not verbal requests, as presently being practiced in directory assistance type services. This narrow usage of the application module allows convenient access to directory assistance that primarily provides data and chunks of information in a short period of time consistent with directory assistance today.

FIG. **31** shows a web page screen with a data provider icon displayed on the device. Pressing or otherwise selecting the icon will enable a menu for the requester to specify a data request. Download will be in the form of a compressed digital data file that may include video, sound, or other digitally encoded data.

While this invention has been described with reference to illustrative embodiments, this description is not intended to be construed in any limiting sense. Various other embodiments of the invention will be apparent to persons skilled in the art upon reference to this description. It is therefore contemplated that the appended claims will cover any such modifications of the embodiments as fall within the true scope and spirit of the invention.

What is claimed is:

1. A location tagged information storage and transceiver system comprising:

a transceiver, the transceiver receiving digital data from a personal digital communication device and transmitting digital data to the personal digital communication device;

a computer processor;

computer memory for storing map data for geographic areas and non-map data, with the non-map data in linked data fields concerning specific locations within the geographic areas for which map data is available, the non-map data tagged to the map data;

a sorting application module executed by the computer processor, the sorting application module responsive to requests from the personal digital communication device, the requests being for a specified maximum number of specified non-map data concerning specified geographic areas, the sorting application module searching the computer memory by data fields for the specified non-map data and providing the specified non-map data and map data linked to the specified non-map data to the transceiver for transmission to the personal digital communication device.

2. The location tagged information storage and transceiver system of claim **1** further comprising a linking and tagging module executed by the processor for linking data pertaining to a specific geographic location in linked data fields and tagging the linked data fields with a marker indicative of geographic location.

3. The location tagged information storage and transceiver system of claim **1** wherein the specified non-map data includes restaurant listings.

4. The location tagged information storage and transceiver system of claim **1** wherein the specified non-map data includes hours of operation.

5. The location tagged information storage and transceiver system of claim **1** wherein the specified non-map data includes traffic reports.

6. The location tagged information storage and transceiver system of claim **1** wherein the specified non-map data includes weather reports.

7. The location tagged information storage and transceiver system of claim **1** wherein the specified non-map data includes yellow page entries.

8. A method for storing and transmitting geo-relevant information comprising:

storing map data for geographic areas and non-map data, with the non-map data in linked data fields concerning specific locations within the geographic areas;

receiving a request from a user for a specified maximum number of listings of non-map data;

searching the map data and the non-map data to obtain specific map data and non-map data in response to the request; and

automatically transmitting the specific map data and up to the maximum number of listings of non-map data to the user.

9. The method for storing and transmitting geo-relevant information of claim **8** wherein the non-map data includes restaurant listings.

10. The method for storing and transmitting geo-relevant information of claim **8** wherein the non-map data includes hours of operation.

11. The method for storing and transmitting geo-relevant information of claim **8** wherein the non-map data includes traffic reports.

12. The method for storing and transmitting geo-relevant information of claim **8** wherein the non-map data includes weather reports.

13. The method for storing and transmitting geo-relevant information of claim **8** wherein the non-map data includes yellow page entries.

14. The method for storing and transmitting geo-relevant information of claim **8** wherein the map data includes latitude and longitude data.

15. The method for storing and transmitting geo-relevant information of claim **8** wherein the request includes information indicating a specified manner of transmission to the user of the specific map data and non-map data.

* * * * *

EXHIBIT B

US006868335B2

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

(10) **Patent No.: US 6,868,335 B2**
(45) **Date of Patent: Mar. 15, 2005**

(54) **PERSONAL COMMUNICATION SYSTEM FOR COMMUNICATING VOICE DATA POSITIONING INFORMATION**

(75) Inventors: **Michael L. Obradovich**, San Clemente, CA (US); **John Dinkel**, Irvine, CA (US); **Michael Kent**, Garden Grove, CA (US)

(73) Assignee: **American Calcar, Inc.**, Wilmington, DE (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/376,971**

(22) Filed: **Feb. 27, 2003**

(65) **Prior Publication Data**

US 2003/0163251 A1 Aug. 28, 2003

Related U.S. Application Data

(60) Continuation of application No. 09/669,527, filed on Sep. 25, 2000, now Pat. No. 6,529,824, which is a division of application No. 08/879,955, filed on Jun. 20, 1997, now Pat. No. 6,148,261.

(51) **Int. Cl.**[7] **H04B 7/26**; H04Q 7/20; G08G 1/123

(52) **U.S. Cl.** **701/208**; 701/202; 340/990

(58) **Field of Search** 701/202, 208, 701/200, 212, 207, 213; 340/995.12, 995.23, 995.1, 990, 991, 995.24, 7.56; 342/450, 357.1

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,350,970	A	9/1982	von Tomkewitsch	340/23
4,521,857	A	6/1985	Reynolds, III	379/88.17
4,792,803	A	12/1988	Madnick et al.	340/905
4,812,843	A	3/1989	Champion, III et al.	340/905
4,977,509	A	12/1990	Pitchford et al.	340/905
5,023,934	A	6/1991	Wheeless	455/45
5,043,736	A	8/1991	Darnell et al.	342/357
5,075,693	A	12/1991	McMillan et al.	
5,119,504	A	6/1992	Durboraw, III	455/556.2
5,124,915	A	6/1992	Krenzel	364/420
5,127,674	A	7/1992	Lamphere et al.	283/37
5,157,614	A	10/1992	Kashiwazaki et al.	
5,164,904	A	11/1992	Sumner	364/436
5,189,632	A	2/1993	Paajanen et al.	708/109
5,225,843	A	7/1993	Thompson	342/367
5,235,633	A	8/1993	Dennison et al.	455/456.3
5,265,024	A	11/1993	Crabill et al.	364/443
5,267,042	A	11/1993	Tsuchiya et al.	358/209
5,272,638	A	12/1993	Martin et al.	455/456.5
5,295,064	A	3/1994	Malec et al.	364/401
5,299,132	A	3/1994	Wortham	455/457
5,334,974	A	8/1994	Simms et al.	340/990
5,335,276	A	8/1994	Thompson et al.	380/266
5,406,493	A *	4/1995	Goto et al.	364/449
5,420,592	A	5/1995	Johnson	342/357
5,432,841	A	7/1995	Rimer	379/59

(List continued on next page.)

OTHER PUBLICATIONS

AAA Map'n'Go Travel Package web pages, 7 pages, month, year is not available.

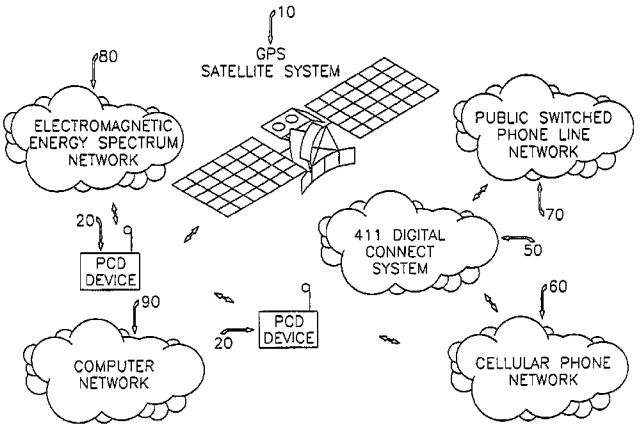
(List continued on next page.)

Primary Examiner—Tan Q. Nguyen
Assistant Examiner—Dalena Tran
(74) *Attorney, Agent, or Firm*—Christie, Parker & Hale, LLP

(57) **ABSTRACT**

A location tagged data provision and display system. A personal communication device (PCD) with electromagnetic communication capability has a GPS receiver and a display. The PCD requests maps and location tagged data from data providers and other for display on the PCD. The data providers respond to requests by using searching and sorting schemes to interrogate data bases and then automatically transmitting data responsive to the requests to the requesting PCD.

10 Claims, 31 Drawing Sheets



U.S. PATENT DOCUMENTS

5,450,329	A		9/1995	Tanner 364/449
5,479,351	A		12/1995	Woo et al. 364/449
5,479,482	A		12/1995	Grimes 379/59
5,497,339	A		3/1996	Bernard 708/109
5,504,482	A		4/1996	Schreder 340/995.13
5,504,684	A		4/1996	Lau et al. 364/443
5,517,193	A		5/1996	Allison et al. 342/26
5,519,403	A		5/1996	Bickley et al. 342/352
5,523,950	A		6/1996	Peterson 364/436
5,528,248	A		6/1996	Steiner et al. 342/357.06
5,528,493	A		6/1996	Potter 364/420
5,539,645	A		7/1996	Mandhyan et al. 364/438
5,543,789	A		8/1996	Behr et al. 340/995.12
5,544,061	A	*	8/1996	Morimoto et al. 364/444
5,555,286	A		9/1996	Tendler 455/404.2
5,559,520	A		9/1996	Barzegar et al. 342/357
5,559,707	A		9/1996	DeLorme et al.
5,572,204	A		11/1996	Timm et al. 340/988
5,579,535	A		11/1996	Orlen et al. 455/421
5,600,796	A		2/1997	Okamura et al. 714/15
5,604,676	A		2/1997	Penzias 364/464.27
5,625,668	A		4/1997	Loomis et al. 455/456.5
5,625,884	A		4/1997	Gitlin et al. 455/426.1
5,627,547	A		5/1997	Ramaswamy et al. 701/300
5,627,549	A		5/1997	Park 342/357
5,630,068	A		5/1997	Vela et al. 395/201
5,638,279	A		6/1997	Kishi et al. 364/443
5,640,156	A		6/1997	Okuda et al. 340/928
5,642,285	A		6/1997	Woo et al. 340/449.7
5,648,763	A		7/1997	Long 340/825.4
5,648,769	A		7/1997	Sato et al. 340/988
5,652,379	A		7/1997	Fukatani 73/116
5,654,886	A		8/1997	Zereski, Jr. et al. 702/3
5,661,652	A		8/1997	Sprague et al. 702/3
5,663,548	A		9/1997	Hayashi et al. 235/384
5,673,039	A		9/1997	Pietzsch et al. 340/905
5,675,732	A		10/1997	Majeti et al. 395/200.01
5,677,837	A		10/1997	Reynolds 702/3
5,680,444	A		10/1997	Reeves 379/67
5,689,252	A		11/1997	Ayanoglu et al. 702/3
5,694,514	A		12/1997	Evans et al. 386/46
5,699,056	A		12/1997	Yoshida 340/905
5,699,255	A	*	12/1997	Ellis et al. 364/449.6
5,719,936	A		2/1998	Hillenmayer 379/477
5,727,053	A		3/1998	Sizer II et al. 379/142
5,731,997	A		3/1998	Manson et al. 364/559
5,742,509	A		4/1998	Goldberg et al. 701/211
5,745,855	A		4/1998	Futamura 455/517
5,748,106	A		5/1998	Schoenian et al. 340/928
5,760,742	A		6/1998	Branch et al. 340/928
5,774,070	A		6/1998	Rendon 340/905
5,774,825	A		6/1998	Reynolds 701/207
5,774,827	A		6/1998	Smith, Jr. et al. 701/209
5,781,150	A		7/1998	Norris 342/357
5,786,789	A		7/1998	Janky 342/357.1
5,790,974	A		8/1998	Tognazzini 701/204
5,794,174	A		8/1998	Janky et al. 701/207
5,802,492	A		9/1998	DeLorme et al. 455/456.5
5,809,247	A		9/1998	Richardson et al. ... 395/200.48
5,815,683	A		9/1998	Vogler 395/500
5,819,227	A		10/1998	Obuchi 705/1
5,864,305	A		1/1999	Rosenquist 340/905
5,908,464	A		6/1999	Kishigami et al. 701/208
5,917,405	A		6/1999	Joao 705/1
5,919,246	A		7/1999	Waizmann et al. 701/209
5,929,774	A		7/1999	Charlton 340/7.1
5,938,721	A		8/1999	Dussell et al. 701/211
5,946,626	A		8/1999	Foladare et al. 455/456.1
5,950,173	A		9/1999	Perkowski 705/26
5,963,956	A		10/1999	Smartt 707/104
5,982,298	A		11/1999	Lappenbusch et al. 340/905
5,999,124	A		12/1999	Sheynblat 342/357.09
5,999,877	A		12/1999	Takahashi et al. 701/117
6,028,550	A		2/2000	Froeberg et al. 342/357.13
6,047,327	A		4/2000	Tso et al. 709/232
6,075,874	A		6/2000	Higashikubo et al. 382/104
6,087,965	A		7/2000	Murphy 340/991
6,091,956	A	*	7/2000	Hollenberg 455/456.5
6,092,076	A		7/2000	McDonough et al. 707/102
6,107,944	A		8/2000	Behr et al. 340/995
6,119,066	A		9/2000	Sugiura et al. 701/208
6,122,506	A		9/2000	Lau et al. 455/427
6,124,825	A		9/2000	Eschenbach 342/357.08
6,127,945	A		10/2000	Mura-Smith 340/988
6,131,066	A		10/2000	Ahrens et al. 701/200
6,131,067	A		10/2000	Girerd et al. 340/988
6,134,501	A		10/2000	Oumi 701/209
6,144,920	A		11/2000	Mikame 701/212
6,147,598	A		11/2000	Murphy et al. 340/426
6,148,261	A		11/2000	Obradovich et al. 701/208
6,163,749	A		12/2000	McDonough et al. 701/208
6,163,753	A		12/2000	Beckmann et al. 701/213
6,166,626	A		12/2000	Janky et al. 701/208
6,169,955	B1		1/2001	Fultz 701/200
6,173,231	B1		1/2001	Chojnacki 701/208
6,184,801	B1		2/2001	Janky 340/988
6,185,427	B1		2/2001	Krasner et al. 455/456.2
6,188,957	B1		2/2001	Bechtolsheim et al. 701/209
6,192,312	B1		2/2001	Hummelsheim 701/118
6,192,314	B1		2/2001	Khavakh et al. 701/209
6,199,013	B1		3/2001	O'Shea 701/211
6,202,023	B1		3/2001	Hancock et al. 701/201
6,208,934	B1		3/2001	Bechtolsheim et al. 701/209
6,212,392	B1		4/2001	Fitch et al. 455/456.2
6,212,470	B1		4/2001	Seymour et al. 340/995.2
6,212,472	B1		4/2001	Nonaka et al. 701/208
6,212,473	B1		4/2001	Stefan et al. 701/210
6,212,550	B1		4/2001	Segur 709/206
6,219,557	B1		4/2001	Havinis 455/456.4
6,219,614	B1		4/2001	Uchigaki et al. 701/211
6,219,694	B1		4/2001	Lazaridis et al. 709/206
6,321,158	B1		11/2001	DeLorme et al. 701/201
6,332,127	B1		12/2001	Bandera et al. 705/14

OTHER PUBLICATIONS

Advertisement, "Collision Avoidance is Critical . . . Now it's Affordable," 1 page.
Advertisement, "Duats," 1 page.
Advertisement, "MFD 5200 Multi–Function Display," 1 page.
Advertisement, "SUPER Road Whiz", 2 pages.
Alcatel web pages, Alcatel, Nov. 24, 1998 (58 pages).
BigYellow web pages, 6 pages.
Bishop, "The Final Stop Remember IVHS?", *ITS World*, Jul./Aug. 2000 (pp. 14–15).
DineNet web pages, 19 pages.
Demmler, "Another Car Navagation System," *Automotive Engineering*, 06/96, pp. 87, 89, 2 pages.
Desmond, "Malone Again," *Fortune Cover Stories*, Publication Date Feb. 16, 1998, pp. 66, 68 & 69.
Geosystems, Corporate web pages, Corporate Backgrounder, 14 pages.
Geosystems, Home and Corporate web pages, 4 pages.
Geosystems, Products and MapRoom web pages, Products & Services, 23 pages.
Giga Information Group, Inc. web pages, Giga Information Group, Inc. Nov. 24, 1998 (4 pages).
Global Map 2000 web pages, 6 pages.

Heuchert, "Eyes Forward: an Ergonomic Solution to Driver Information Overload," *Automotive Engineering*, 09/96, pp. 27–31, 5 pages.
Jewett, "Toyota Offers Navigation System as U.S. Option," *Automotive News*, Nov. 18, 1996, p. 16, 2 pages.
Kelley, "Traffic Control Traffic Data, Unplugged", *ITS World*, Jul./Aug. 2000 (pp. 28–30).
Maps On Us web pages, 14 pages.
Maps On Us web pages, Search Categories, 14 pages.
Mapquest web pages, 1 page.
Metricom in the News, web pages, Metricom, Inc., Nov. 24, 1998 (8 pages).
McDonald, "Course 122—GPS Fundamentals & Applications", *Navtech Seminars & GPS Supply, Inc.*, Catamaran Resort Hotel, San Diego, CA, Mar. 22–23, 1999 (336 sheets).
Monet (Mobile Network), 2 pages.
Nokia 9000 Communicator web pages, 16 pages.
Noriyuki, "Just Think of It as a Big Eye in the Sky . . . Watching," *Los Angeles Times*, Section E, pp. 1, 8, Apr. 27, 1997, 2 pages.
Sedgwick, "Butterfly gives clue to cars of tomorrow", *Automotive News*, Oct. 28, 1996, p. 43, 2 pages.
Spyglass web pages, Spyglass, Nov. 24, 1998 (58 pages).
Steve Dye with Dr. Frank Baylin, The GPS Manual Principles and Applications, "Land Navigation Markets—Overview", Feb. 1997, ISBN:0–917893–29–8, 23 pages.
Think Thin, PC Magazine, Dec. 1, 1998 (p. 9).
"Trimble Demonstrates Trimconnect," Flying, 07/97, p. 51, 1 page.
Wolk, "Microsoft unveils plans for car dashboard computer," *Reuters Article*, Copyright date 1998.
WorldPages web pages, 5 pages.
Yamaguchi, "Honda In–car Navigation System for the U.S.," *Automotive Engineering*, 06/96, pp. 82–84, 3 pages.
Yoshikazu "Intelligent Car—History and the Future in Japan and Toyota," *Toyota Motor Corporation 98C015*, 5 pages.
Supplementary European Search Report for European Application No. 98930417.5–2213, search dated Apr. 23, 2004 and mailed May 4, 2004 (3 pages).

* cited by examiner

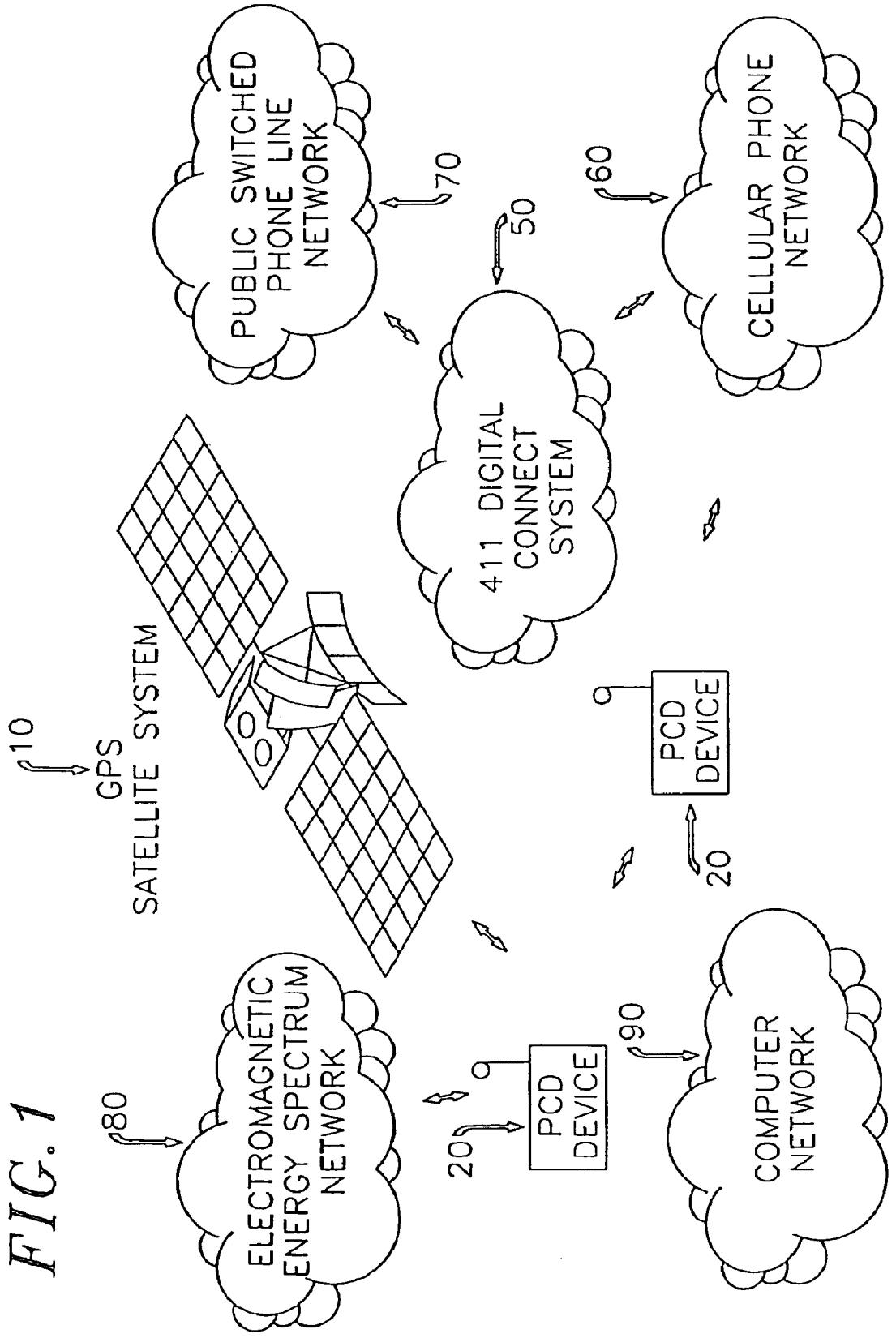

PUBLIC SWITCHED PHONE LINE NETWORK
70
CELLULAR PHONE NETWORK
60
411 DIGITAL CONNECT SYSTEM
50
10
GPS SATELLITE SYSTEM
PCD DEVICE
9
20
ELECTROMAGNETIC ENERGY SPECTRUM NETWORK
80
COMPUTER NETWORK
90

FIG. 1

FIG. 2

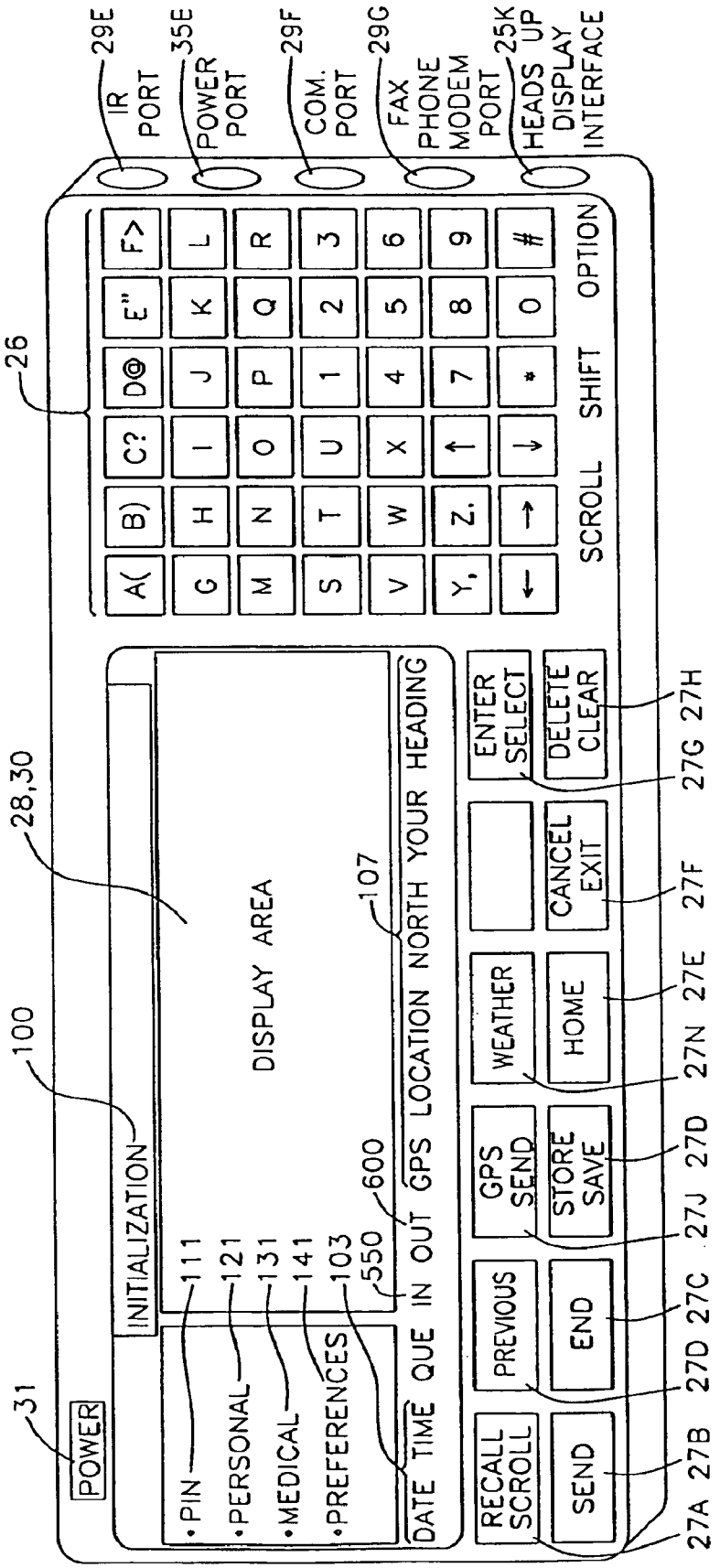

29E
IR PORT
35E
POWER PORT
29F
COM. PORT
29G
FAX PHONE MODEM PORT
25K
HEADS UP DISPLAY INTERFACE
26
A(B) C? D@ E" F>
G H I J K L
M N O P Q R
S T U 1 2 3
V W X 4 5 6
Y, Z. ↑ 7 8 9
← → ↓ * 0 #
SCROLL SHIFT OPTION
28,30
100
INITIALIZATION
DISPLAY AREA
107
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
600
550
111
121
131
141
103
• PIN
• PERSONAL
• MEDICAL
• PREFERENCES
31
POWER
ENTER SELECT
DELETE CLEAR
27G 27H
CANCEL EXIT
27F
WEATHER
HOME
27N 27E
GPS SEND
STORE SAVE
27J 27D
PREVIOUS
END
27D 27C
RECALL SCROLL
SEND
27A 27B

FIG. 3

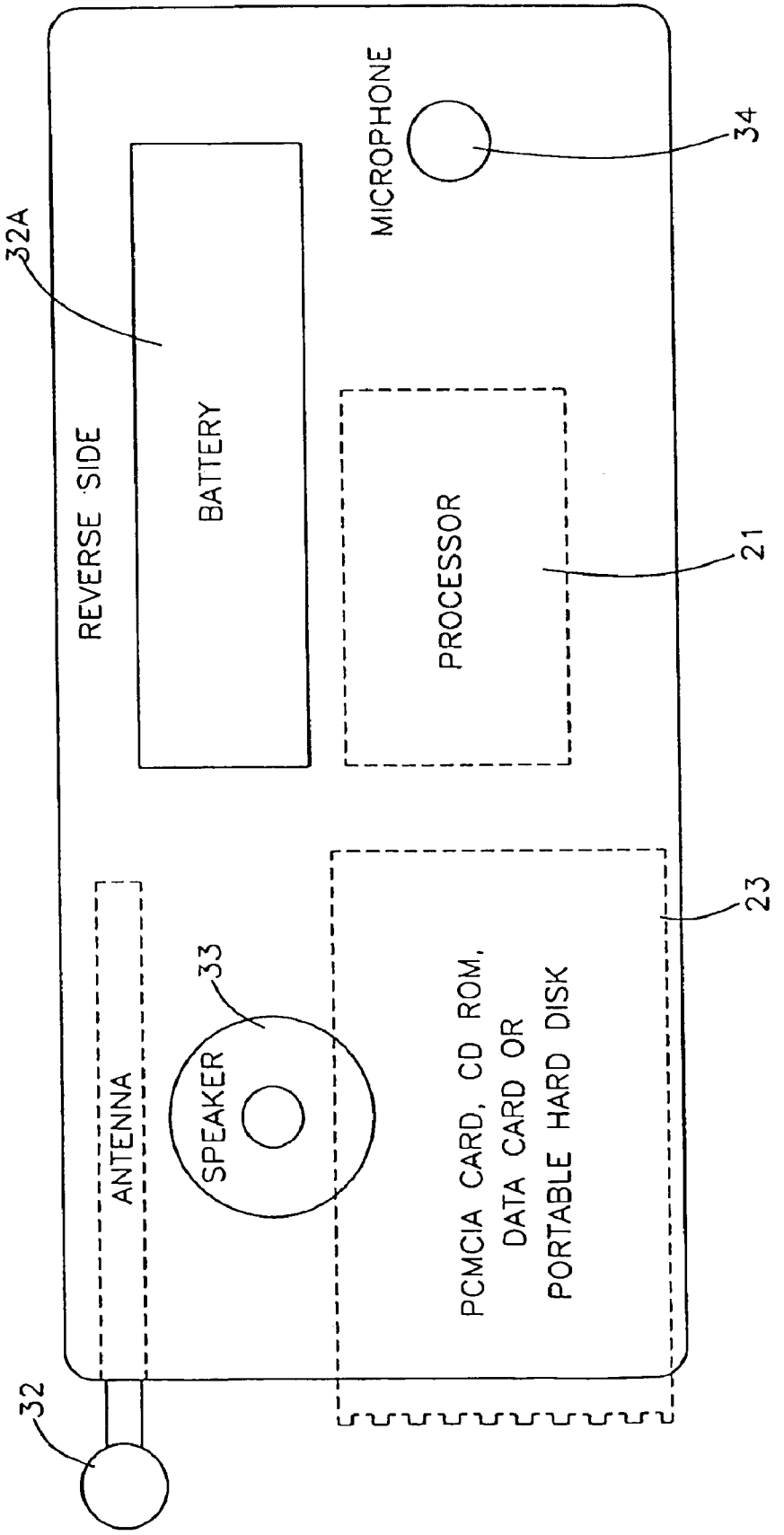

32A
REVERSE SIDE
BATTERY
MICROPHONE
34
PROCESSOR
21
23
ANTENNA
SPEAKER
33
PCMCIA CARD, CD ROM,
DATA CARD OR
PORTABLE HARD DISK
32

FIG. 4

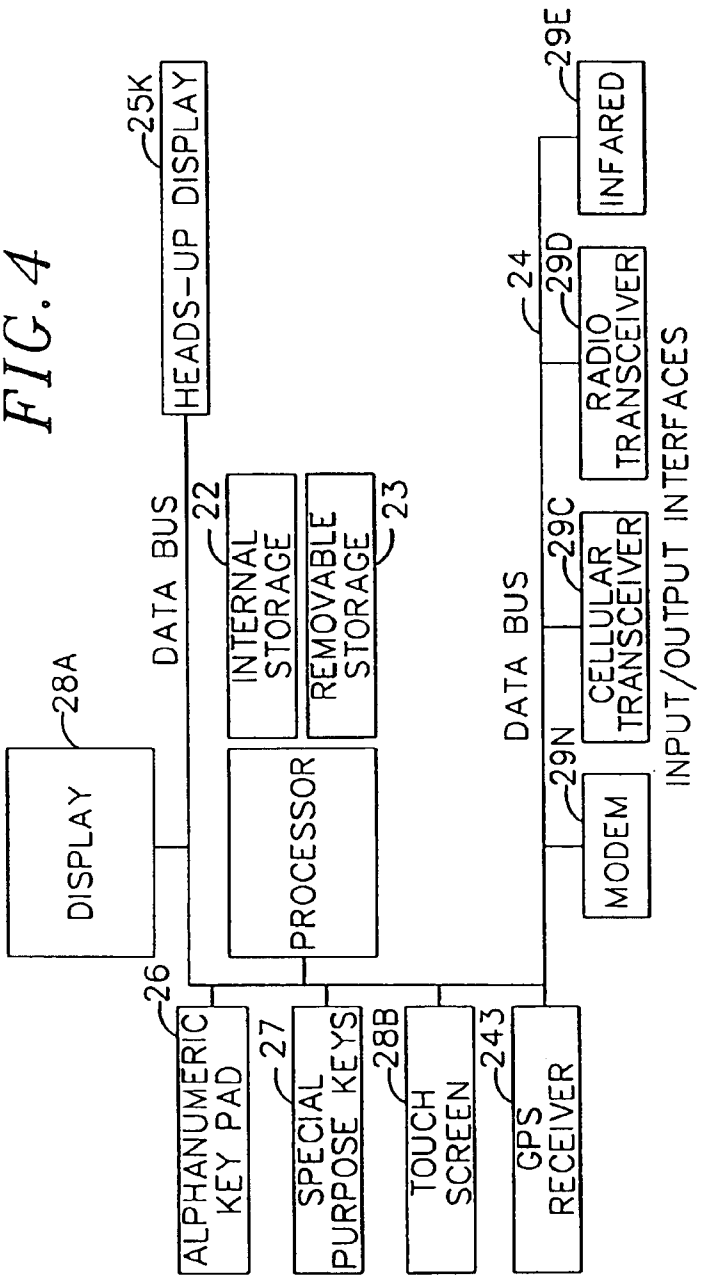

DISPLAY
28A
DATA BUS
HEADS-UP DISPLAY
25K
INTERNAL STORAGE
22
REMOVABLE STORAGE
23
PROCESSOR
26
ALPHANUMERIC KEY PAD
27
SPECIAL PURPOSE KEYS
28B
TOUCH SCREEN
243
GPS RECEIVER
DATA BUS
24
INFARED
29E
RADIO TRANSCEIVER
29D
CELLULAR TRANSCEIVER
29C
MODEM
29N
INPUT/OUTPUT INTERFACES

FIG. 4A

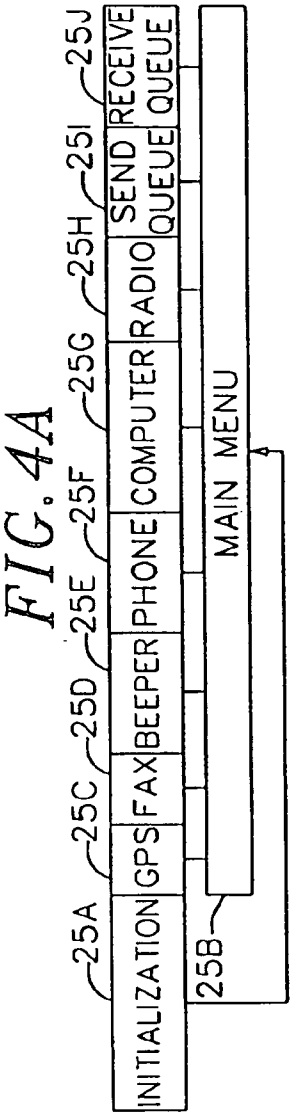
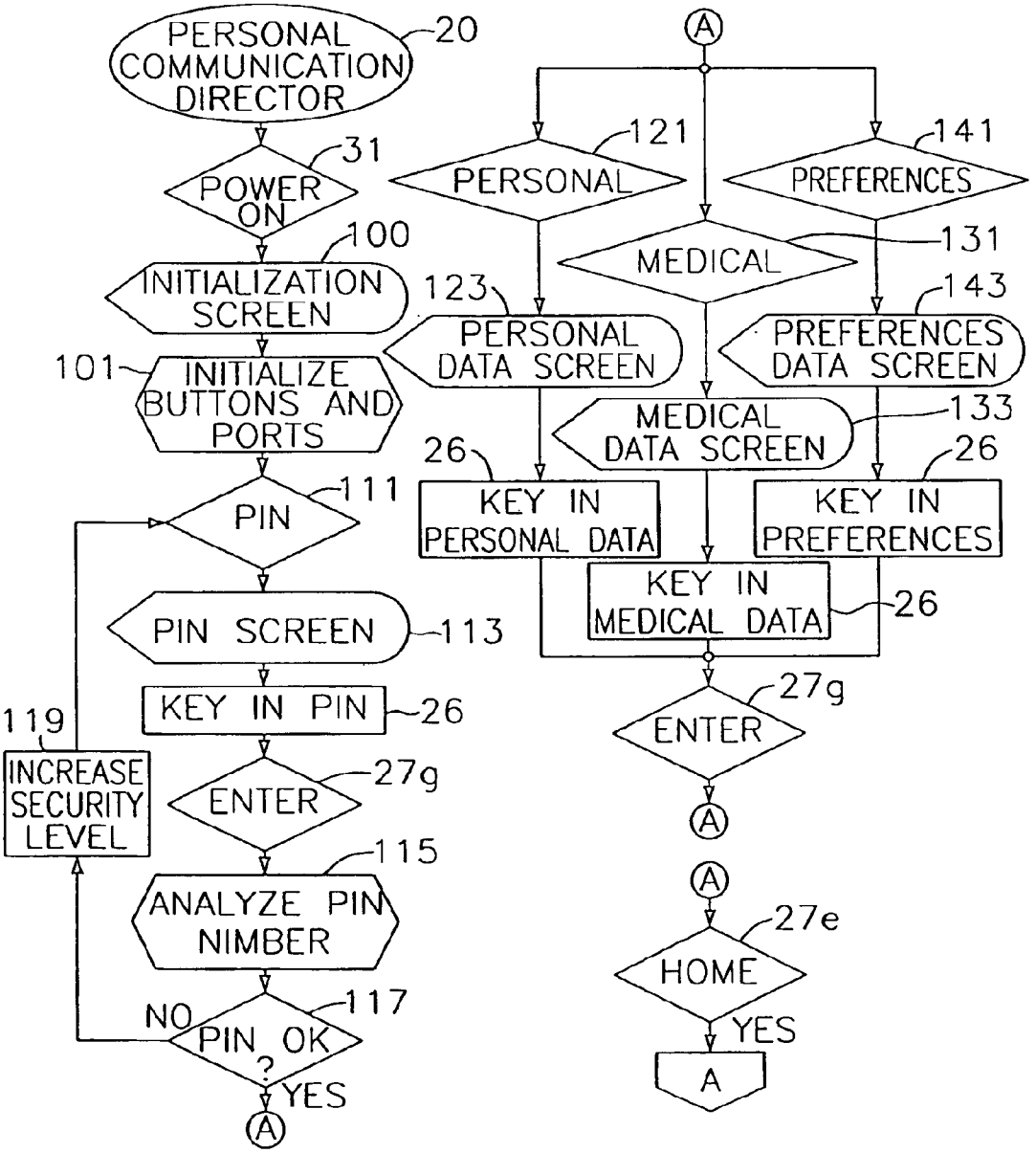

INITIALIZATION
25A
GPS
25C
FAX
25D
BEEPER
25E
PHONE
25F
COMPUTER
25G
RADIO
25H
SEND QUEUE
25I
RECEIVE QUEUE
25J
MAIN MENU
25B

FIG. 5A


PERSONAL COMMUNICATION DIRECTOR
20
POWER ON
31
INITIALIZATION SCREEN
100
INITIALIZE BUTTONS AND PORTS
101
PIN
111
PIN SCREEN
113
KEY IN PIN
26
ENTER
27g
ANALYZE PIN NIMBER
115
PIN OK ?
117
NO
YES
INCREASE SECURITY LEVEL
119
A
PERSONAL
121
MEDICAL
131
PREFERENCES
141
PERSONAL DATA SCREEN
123
MEDICAL DATA SCREEN
133
PREFERENCES DATA SCREEN
143
KEY IN PERSONAL DATA
KEY IN MEDICAL DATA
KEY IN PREFERENCES
ENTER
27g
HOME
27e
YES
A

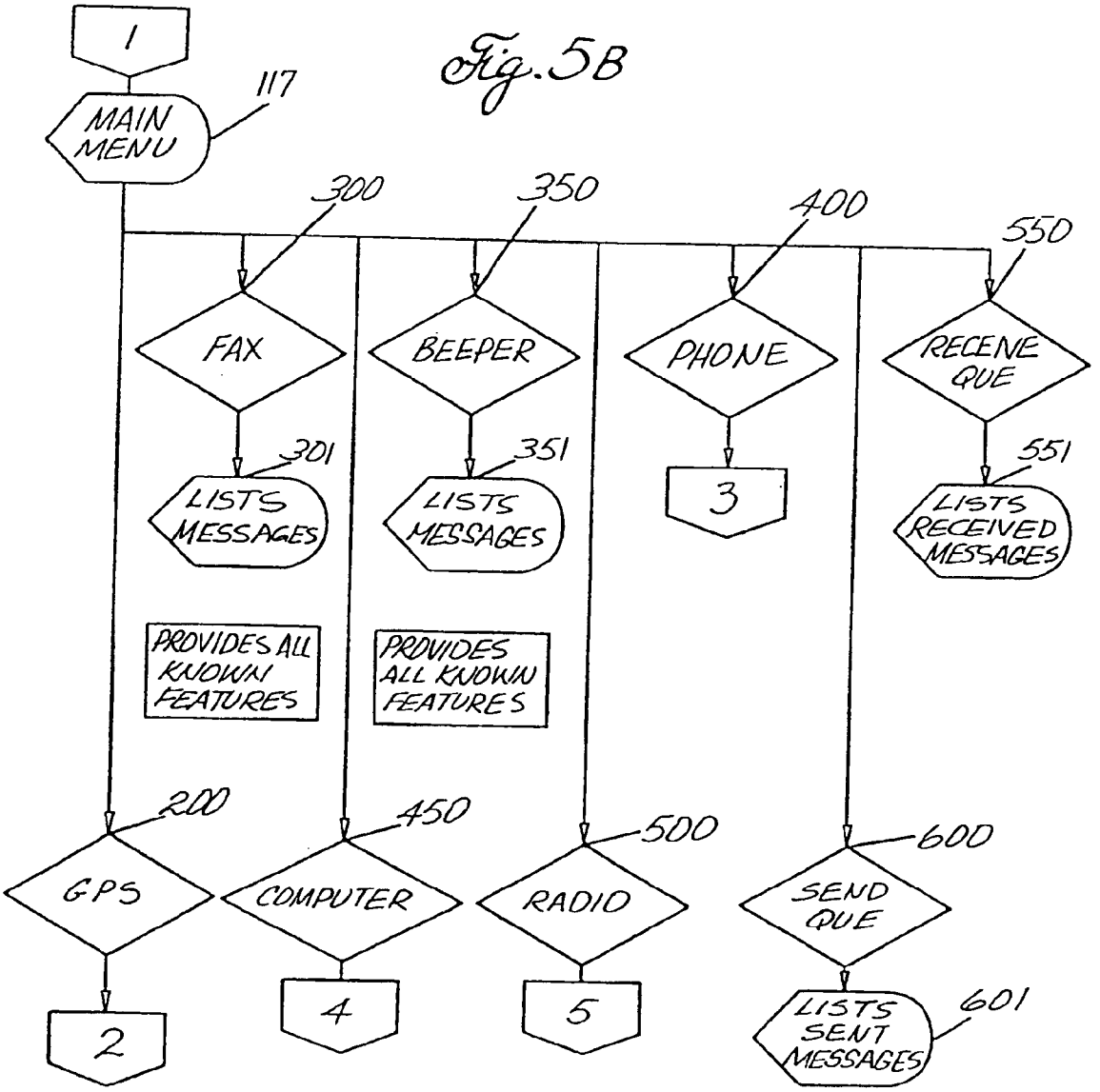

1
MAIN MENU
117
300
350
400
550
FAX
BEEPER
PHONE
RECENE QUE
301
351
551
LISTS MESSAGES
LISTS MESSAGES
3
LISTS RECEIVED MESSAGES
PROVIDES ALL KNOWN FEATURES
PROVIDES ALL KNOWN FEATURES
200
450
500
600
GPS
COMPUTER
RADIO
SEND QUE
2
4
5
LISTS SENT MESSAGES
601

Fig. 5B

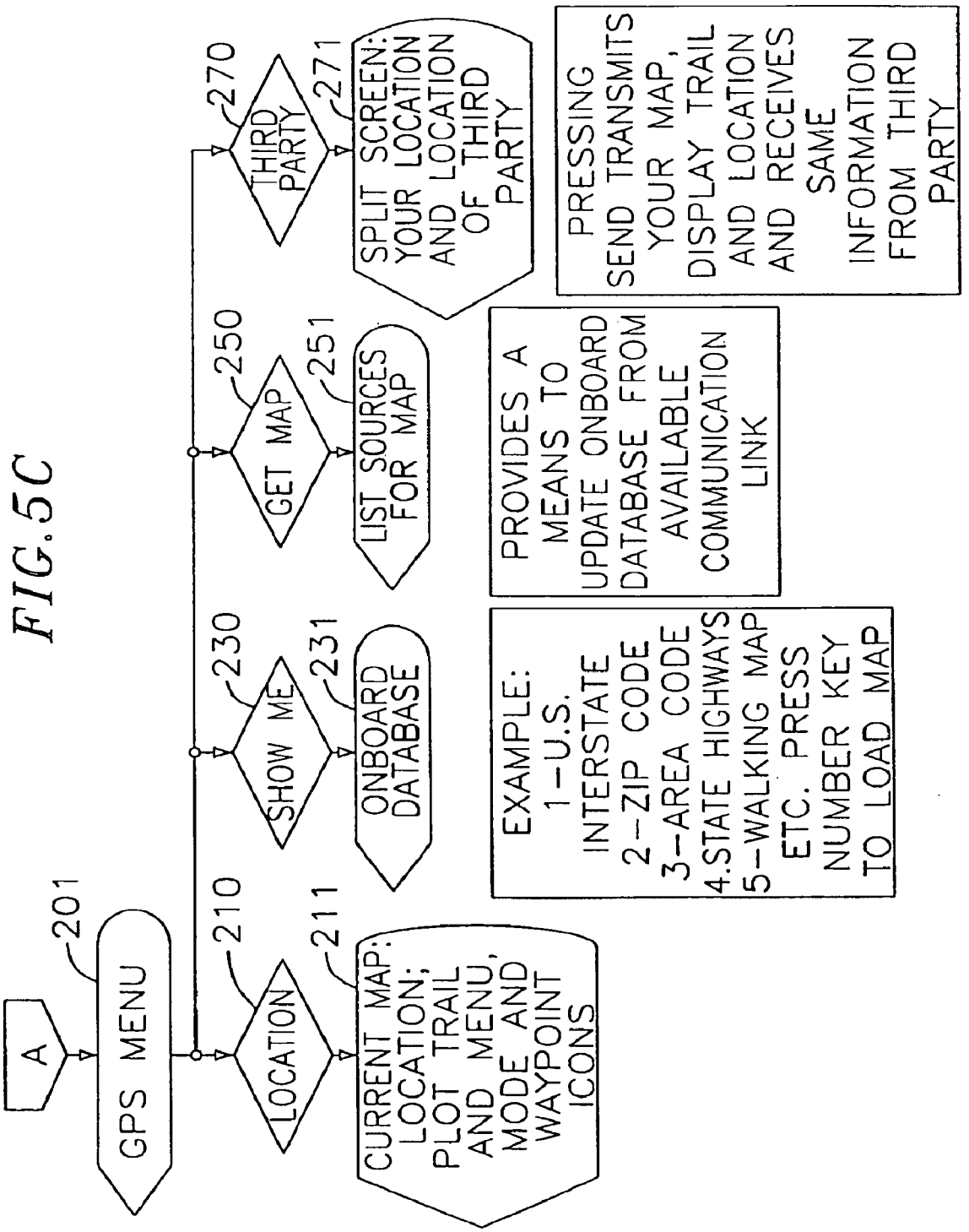

A
201
GPS MENU
210
LOCATION
211
CURRENT MAP: LOCATION; PLOT TRAIL AND MENU, MODE AND WAYPOINT ICONS
230
SHOW ME
231
ONBOARD DATABASE
EXAMPLE: 1-U.S. INTERSTATE 2-ZIP CODE 3-AREA CODE 4.STATE HIGHWAYS 5-WALKING MAP ETC. PRESS NUMBER KEY TO LOAD MAP
250
GET MAP
251
LIST SOURCES FOR MAP
PROVIDES A MEANS TO UPDATE ONBOARD DATABASE FROM AVAILABLE COMMUNICATION LINK
270
THIRD PARTY
271
SPLIT SCREEN: YOUR LOCATION AND LOCATION OF THIRD PARTY
PRESSING SEND TRANSMITS YOUR MAP, DISPLAY TRAIL AND LOCATION AND RECEIVES SAME INFORMATION FROM THIRD PARTY

FIG.5C

FIG. 5D

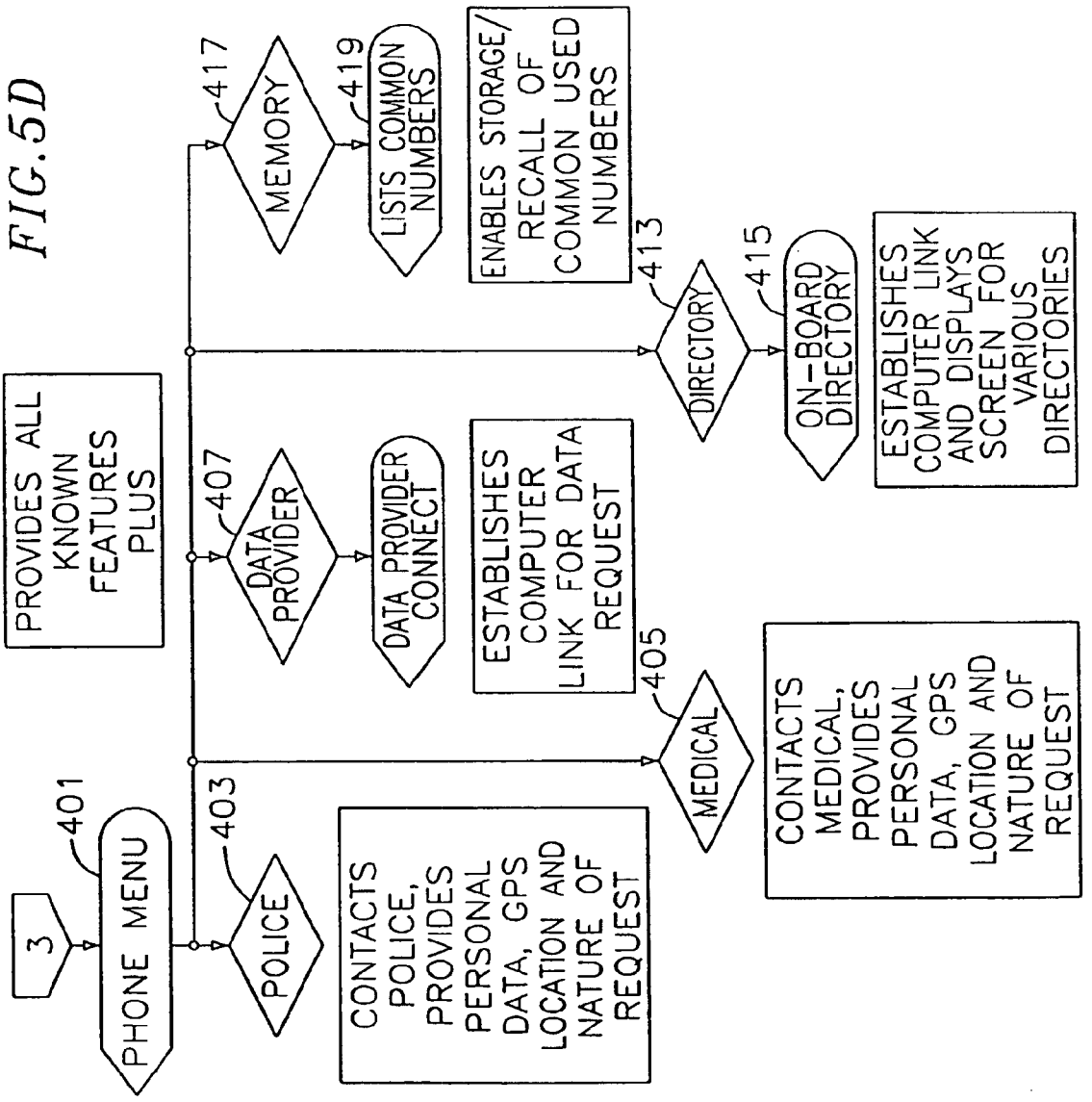

PHONE MENU
401
3
PROVIDES ALL KNOWN FEATURES PLUS
POLICE
403
CONTACTS POLICE, PROVIDES PERSONAL DATA, GPS LOCATION AND NATURE OF REQUEST
DATA PROVIDER
407
DATA PROVIDER CONNECT
ESTABLISHES COMPUTER LINK FOR DATA REQUEST
MEDICAL
405
CONTACTS MEDICAL, PROVIDES PERSONAL DATA, GPS LOCATION AND NATURE OF REQUEST
DIRECTORY
413
ON-BOARD DIRECTORY
415
ESTABLISHES COMPUTER LINK AND DISPLAYS SCREEN FOR VARIOUS DIRECTORIES
MEMORY
417
LISTS COMMON NUMBERS
419
ENABLES STORAGE/ RECALL OF COMMON USED NUMBERS

FIG.5E

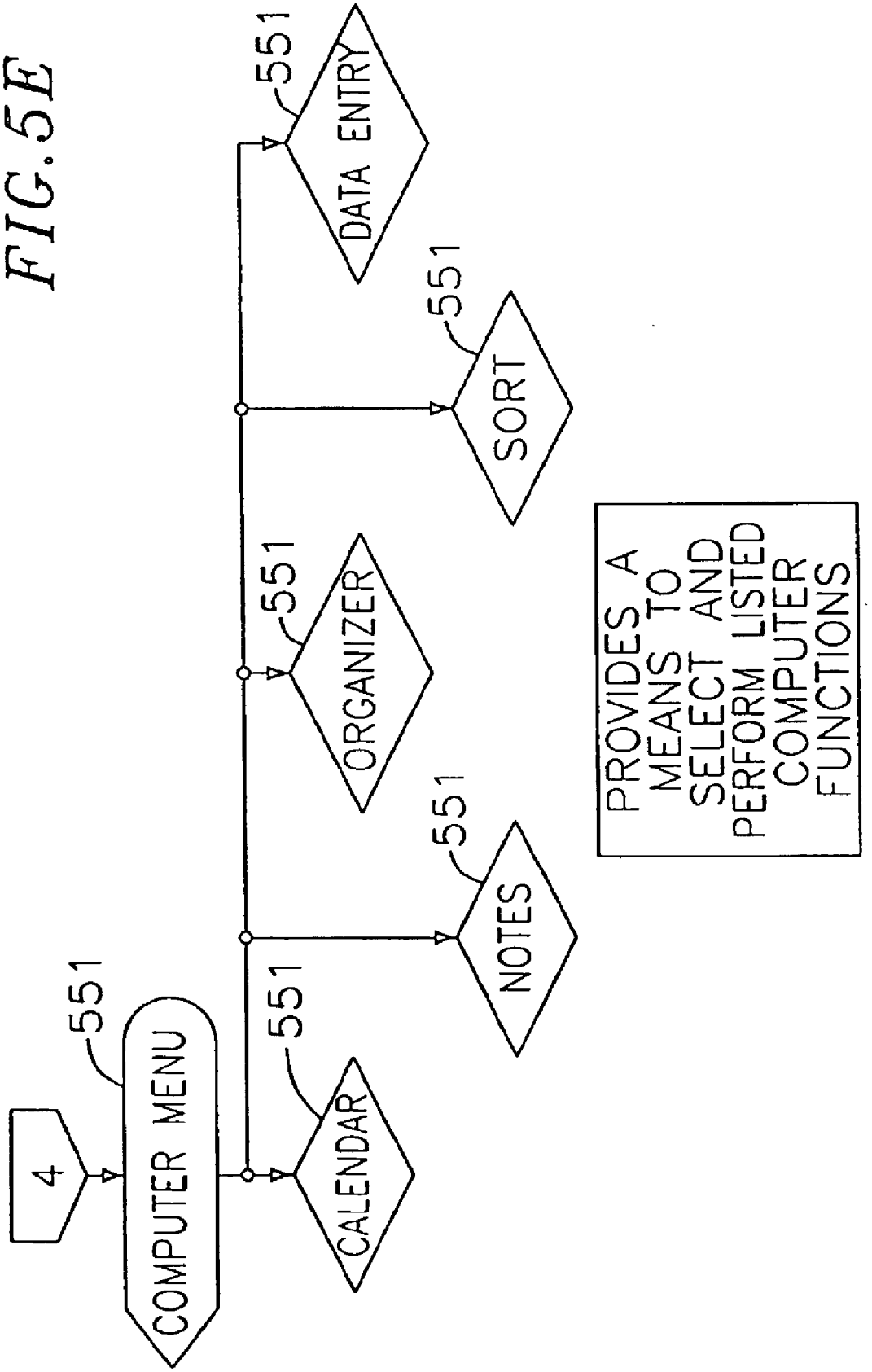

4
COMPUTER MENU
551
CALENDAR
551
NOTES
551
ORGANIZER
551
SORT
551
DATA ENTRY
551
PROVIDES A MEANS TO SELECT AND PERFORM LISTED COMPUTER FUNCTIONS

FIG. 5F

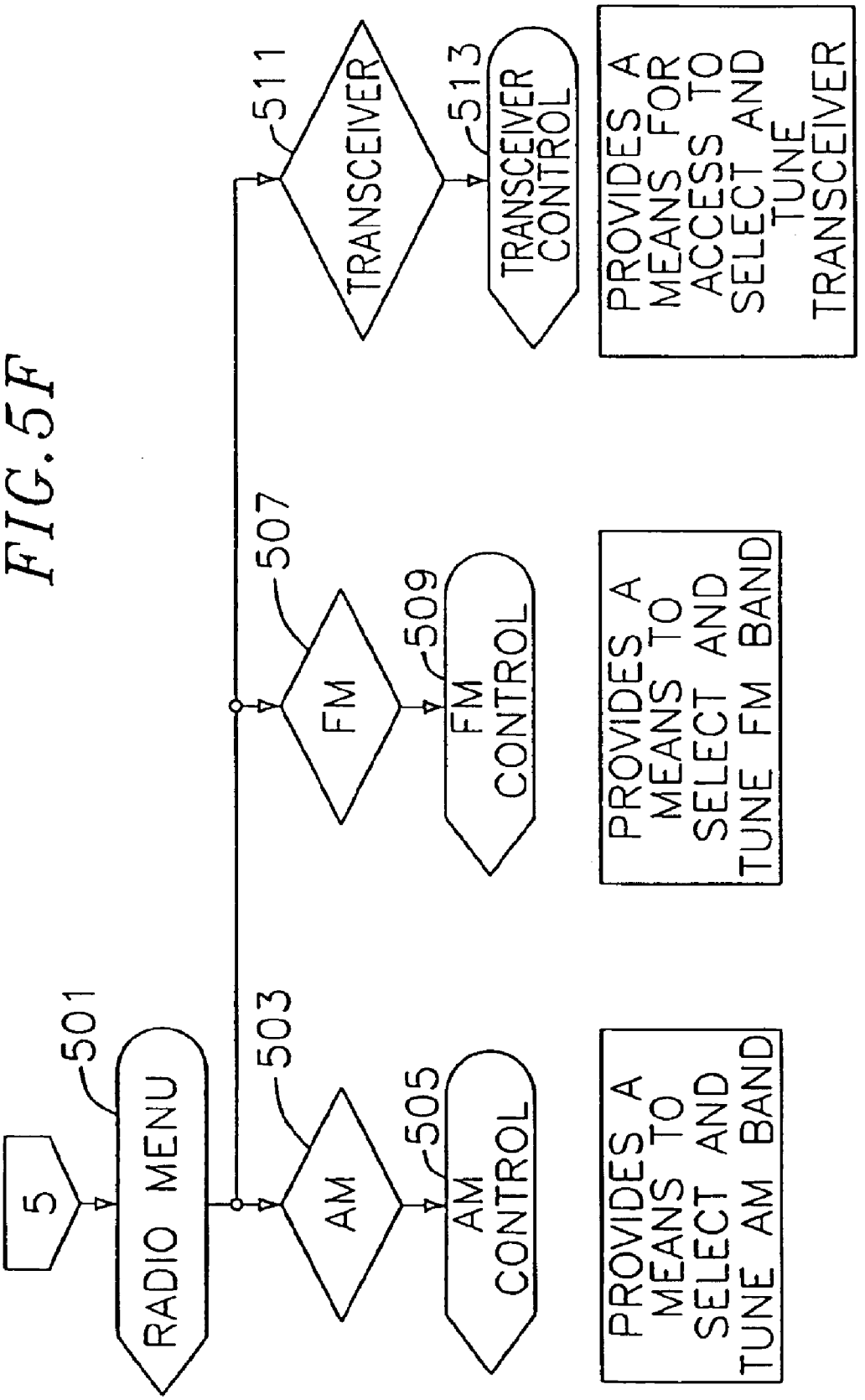

5
501
RADIO MENU
503
AM
505
AM CONTROL
PROVIDES A MEANS TO SELECT AND TUNE AM BAND
507
FM
509
FM CONTROL
PROVIDES A MEANS TO SELECT AND TUNE FM BAND
511
TRANSCEIVER
513
TRANSCEIVER CONTROL
PROVIDES A MEANS FOR ACCESS TO SELECT AND TUNE TRANSCEIVER

FIG. 6

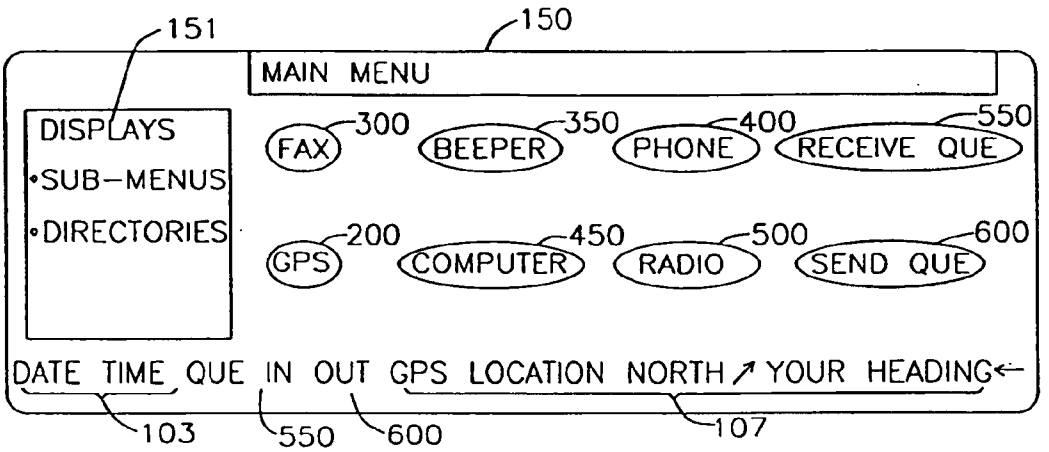

151
150
MAIN MENU
DISPLAYS
•SUB-MENUS
•DIRECTORIES
FAX
300
BEEPER
350
PHONE
400
RECEIVE QUE
550
GPS
200
COMPUTER
450
RADIO
500
SEND QUE
600
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 7

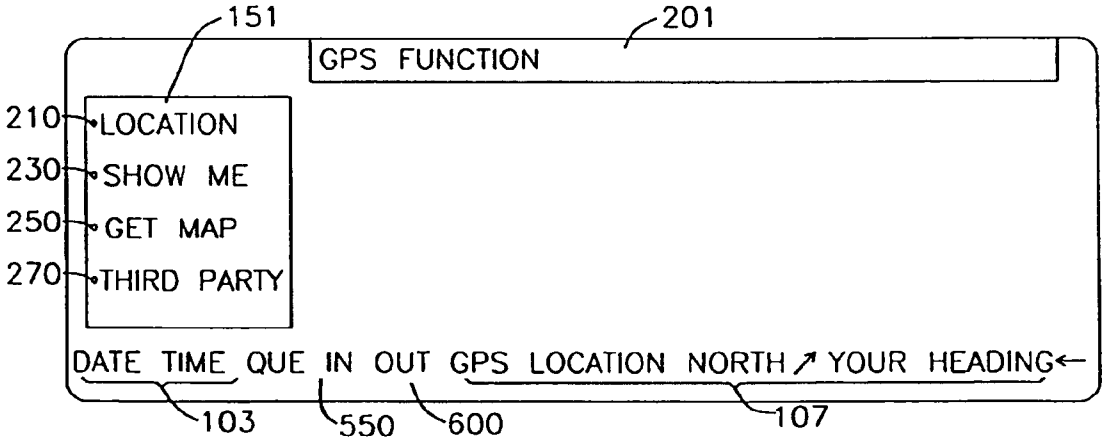

151
201
GPS FUNCTION
210
•LOCATION
230
•SHOW ME
250
•GET MAP
270
•THIRD PARTY
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG.8

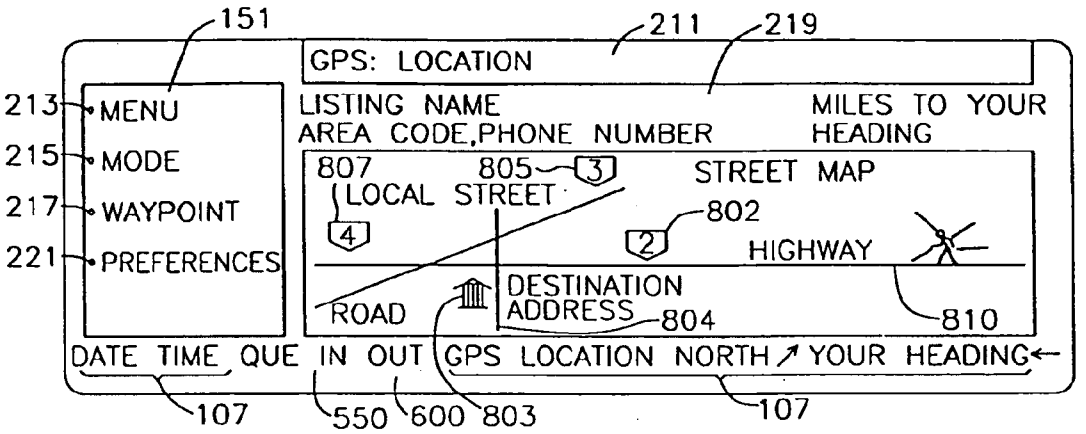

151
211
219
GPS: LOCATION
213
MENU
215
MODE
217
WAYPOINT
221
PREFERENCES
LISTING NAME
AREA CODE,PHONE NUMBER
MILES TO YOUR
HEADING
807
805
3
STREET MAP
LOCAL STREET
4
802
2
HIGHWAY
ROAD
DESTINATION
ADDRESS
804
810
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
107
550
600
803
107

FIG.9

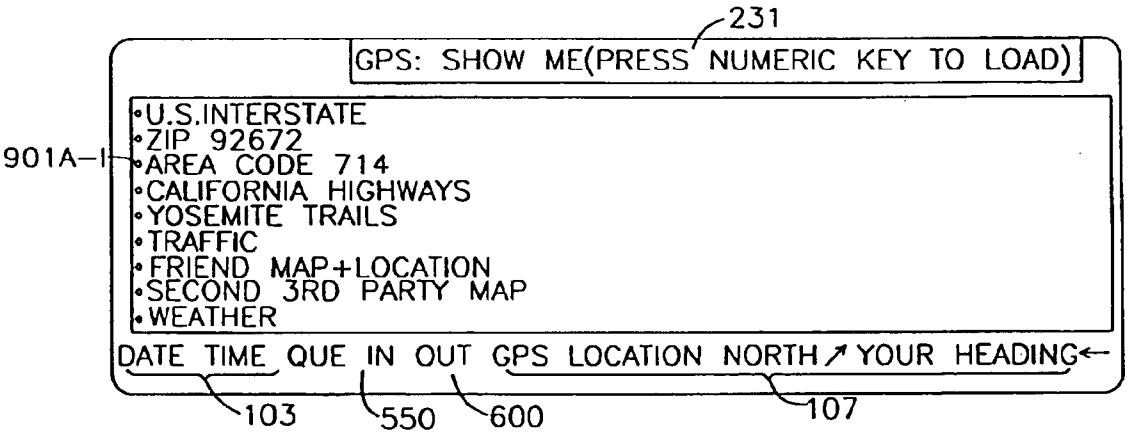

231
GPS: SHOW ME(PRESS NUMERIC KEY TO LOAD)
901A–I
•U.S.INTERSTATE
•ZIP 92672
•AREA CODE 714
•CALIFORNIA HIGHWAYS
•YOSEMITE TRAILS
•TRAFFIC
•FRIEND MAP+LOCATION
•SECOND 3RD PARTY MAP
•WEATHER
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
103
550
600
107

FIG. 10

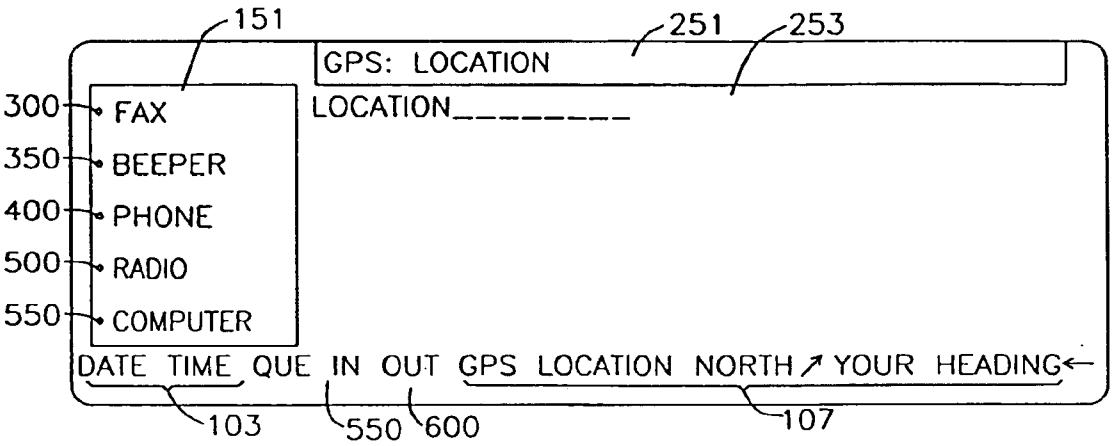

151
251
253
GPS: LOCATION
LOCATION_____
300
FAX
350
BEEPER
400
PHONE
500
RADIO
550
COMPUTER
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
103
550
600
107

FIG. 11

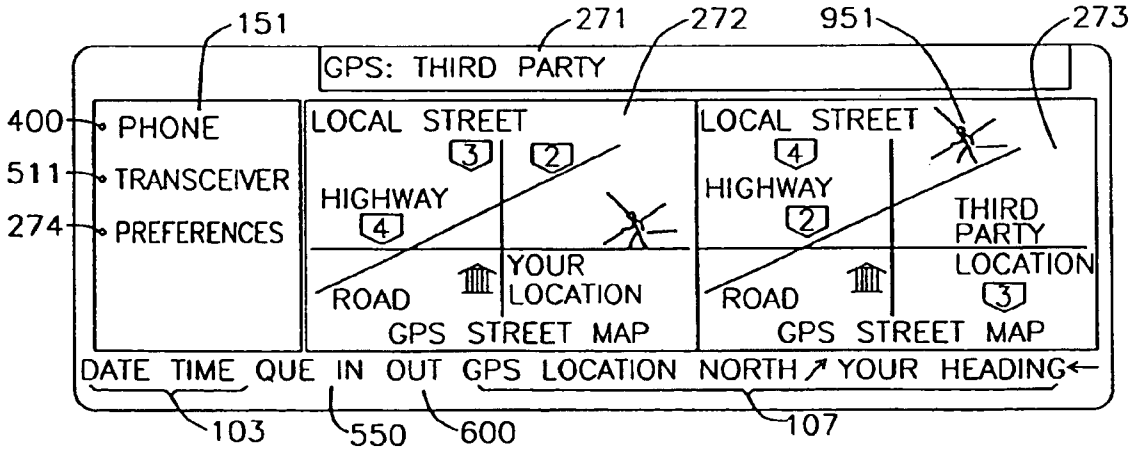

151
271
272
951
273
GPS: THIRD PARTY
400
PHONE
511
TRANSCEIVER
274
PREFERENCES
LOCAL STREET
HIGHWAY
ROAD
YOUR LOCATION
GPS STREET MAP
LOCAL STREET
HIGHWAY
THIRD PARTY LOCATION
ROAD
GPS STREET MAP
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
103
550
600
107

FIG. 12

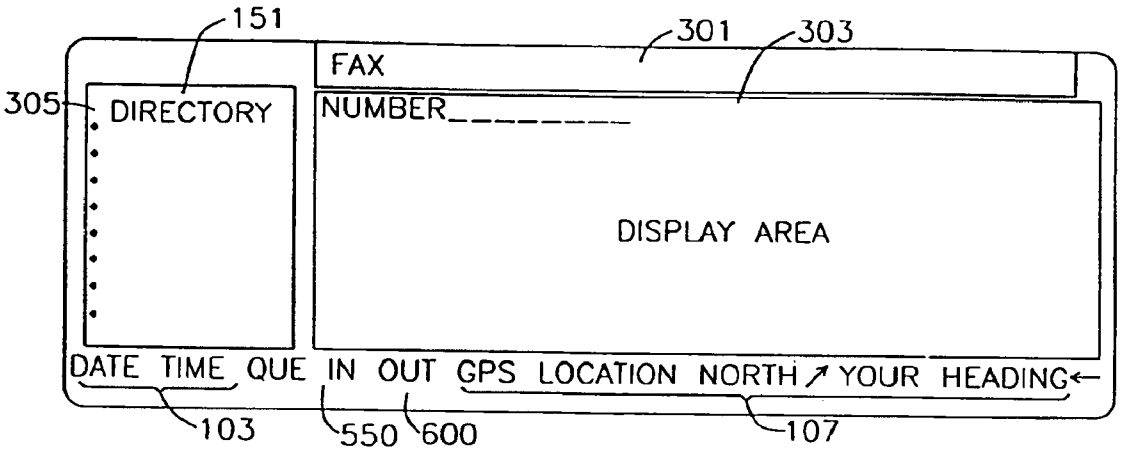

151
301
303
FAX
305
DIRECTORY
NUMBER_____
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 13

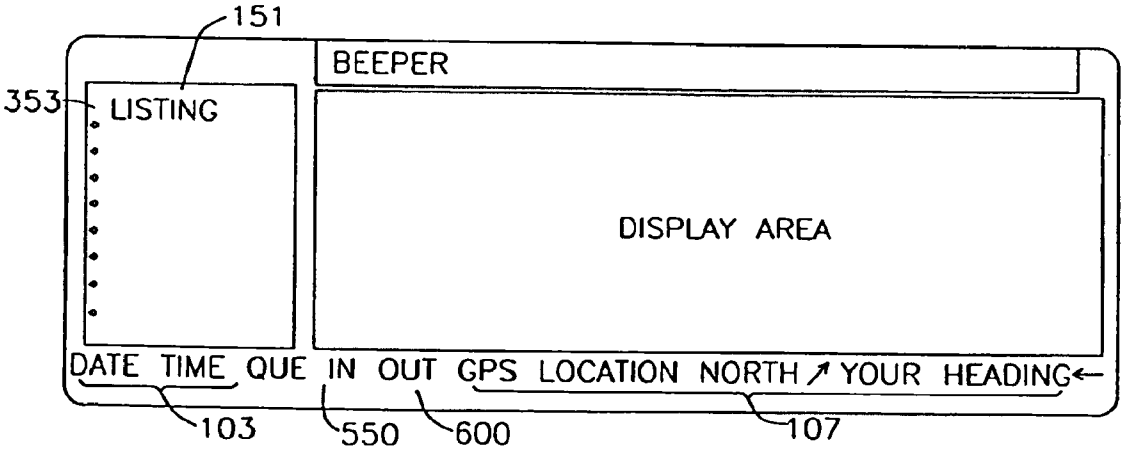

151
BEEPER
353
LISTING
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING←
103
550
600
107

FIG. 14

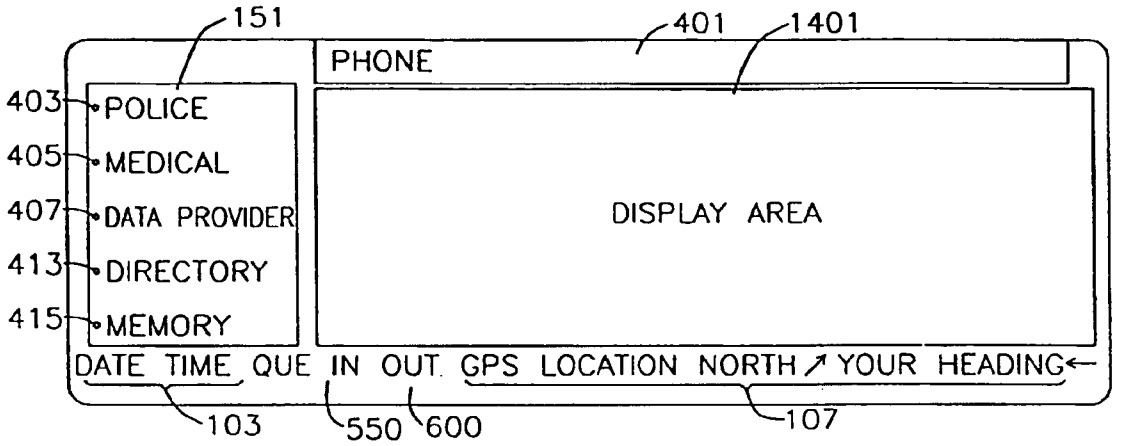

151
401
1401
PHONE
403
POLICE
405
MEDICAL
407
DATA PROVIDER
413
DIRECTORY
415
MEMORY
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
103
550
600
107

FIG. 15

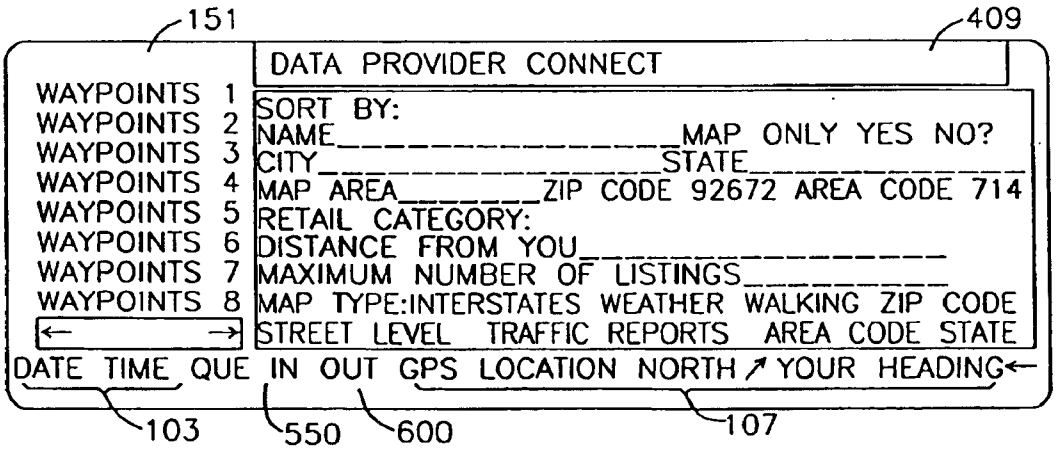

151
409
DATA PROVIDER CONNECT
WAYPOINTS 1
WAYPOINTS 2
WAYPOINTS 3
WAYPOINTS 4
WAYPOINTS 5
WAYPOINTS 6
WAYPOINTS 7
WAYPOINTS 8
← →
SORT BY:
NAME_____MAP ONLY YES NO?
CITY_____STATE_____
MAP AREA_____ZIP CODE 92672 AREA CODE 714
RETAIL CATEGORY:
DISTANCE FROM YOU_____
MAXIMUM NUMBER OF LISTINGS_____
MAP TYPE:INTERSTATES WEATHER WALKING ZIP CODE
STREET LEVEL TRAFFIC REPORTS AREA CODE STATE
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
103
550
600
107

FIG. 16

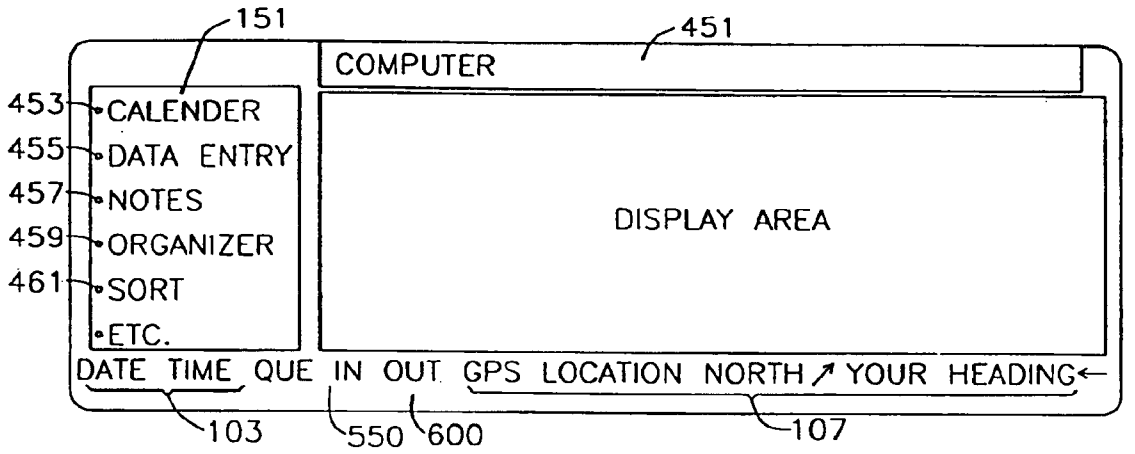

151
451
COMPUTER
453
CALENDER
455
DATA ENTRY
457
NOTES
459
ORGANIZER
461
SORT
ETC.
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
103
550
600
107

FIG. 17

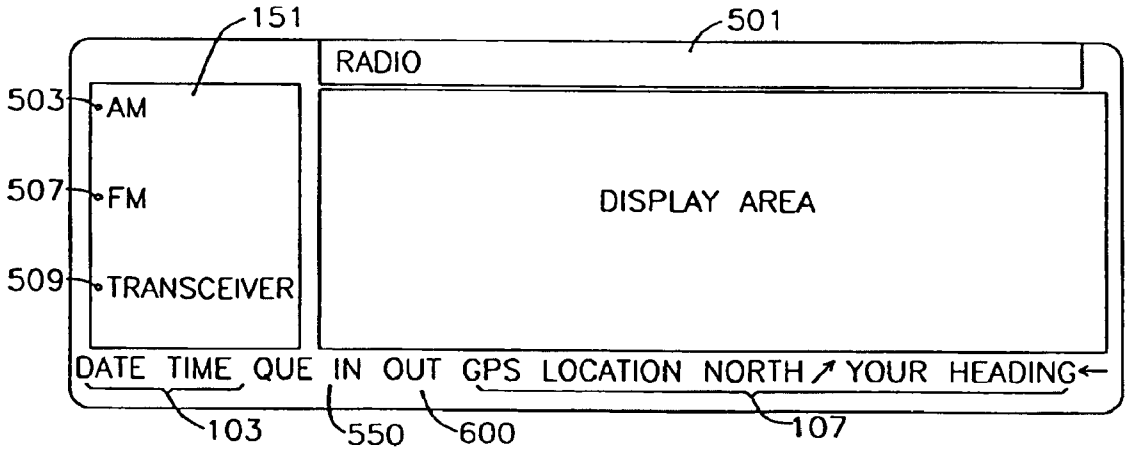

151
501
RADIO
503
AM
507
FM
509
TRANSCEIVER
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING ←
103
550
600
107

FIG. 18

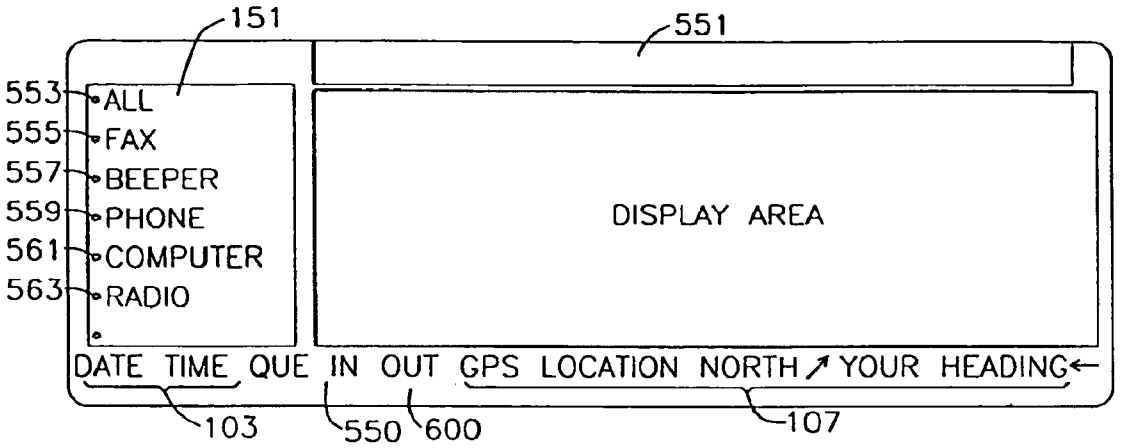

151
551
553
555
557
559
561
563
ALL
FAX
BEEPER
PHONE
COMPUTER
RADIO
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING
103
550
600
107

FIG. 19

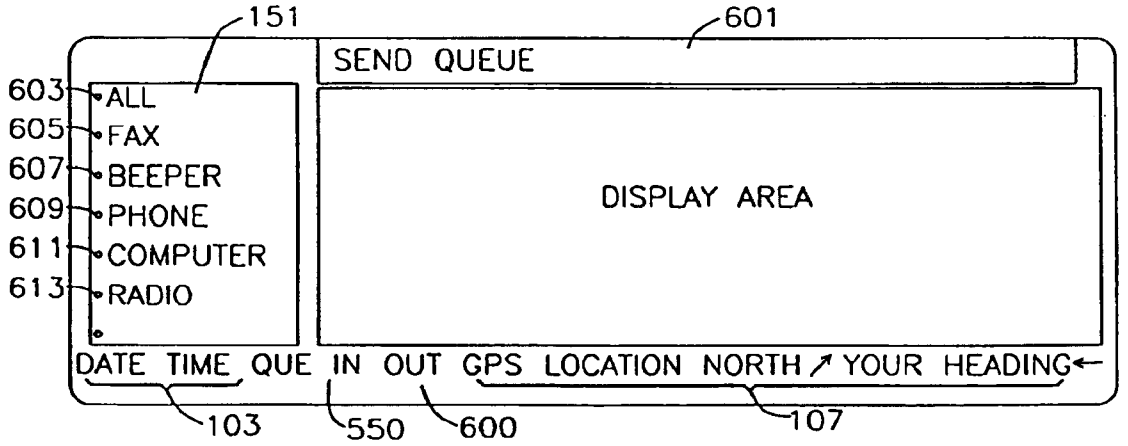

151
601
SEND QUEUE
603
605
607
609
611
613
ALL
FAX
BEEPER
PHONE
COMPUTER
RADIO
DISPLAY AREA
DATE TIME QUE IN OUT GPS LOCATION NORTH ↗ YOUR HEADING
103
550
600
107

FIG. 20

LISTING / NAME / WAYPOINT	ADDRESS	CITY	STATE	PHONE NO	GPS LOCATION NORTH	GPS WEST	WAYPOINT
ALEX'S GERMAN-AMERICAN RESTAURANT	2801 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-8986	33°24.60	117°36.25	1
ANTOINE'S CAFE	218 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-1763	33°25.40	117°37.38	2
BAKER'S SQUARE RESTAURANT & PIES	610 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-661-3100	33°27.80	117°39.60	3
BEACH GARDEN CAFE	618 1/2 AVENIDA VICTORIA	SAN CLEMENTE	CA	714-498-8145	33°25.35	117°37.36	4
BOOTLEGGERS GRILL & SPEAKEASY	111 AVE. PALIZADA	SAN CLEMENTE	CA	714-361-8658	33°25.65	117°37.85	5
BURBON STREET SANDWICHERY	430 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-7827	33°25.58	117°37.76	6
BURGER STOP	524 AVENIDA PICO	SAN CLEMENTE	CA	714-492-2350	33°25.92	117°37.12	7
BURRITO BASKET, THE	2017 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-5002	33°25.10	117°36.34	8
CAFE CALYPSO	114 AVENIDA DEL MAR	SAN CLEMENTE	CA	714-366-9346	33°25.42	117°37.42	9
CAFE EXPRESSO	641 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-240-3467	33°25.81	117°37.31	10
CAPTAIN CULVER COUNTERCULTURE NATURAL FOODS	149 AVENIDA DEL MAR	SAN CLEMENTE	CA	714-498-8098	33°25.39	117°37.40	11
CARL'S JR. RESTAURANT	638 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-493-0189	33°27.65	117°39.45	12
CARL'S JR. RESTAURANT	3929 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-5641	33°24.50	117°35.95	13
CARROWS RESTAURANT	620 AVENIDA PICO	SAN CLEMENTE	CA	714-492-4290	33°25.85	117°37.10	14
CHINA BEACH CANTEEN	2369 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-6228	33°27.80	117°37.15	15
CHINA WELL RESTAURANT	620 CAMINO DE LOS MARES	SAN CLEMENTE	CA	714-661-6813	33°27.61	117°39.42	16
COCO'S FAMILY RESTAURANT	2350 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-1542	33°24.90	117°36.18	17
CORKY'S CAFE	2727 VIA CASCADITA	SAN CLEMENTE	CA	714-492-1135	33°25.10	117°37.48	18
COURTSIDE RESTAURANT	111 AVE. VISTA MONTANA	SAN CLEMENTE	CA	714-361-2211	33°25.10	117°36.10	19
DAVE'S MEXICAN RESTAURANT	1701 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-7867	33°25.50	117°38.90	20
DEL TACO	109 CALLE DE INDUSTRIAS	SAN CLEMENTE	CA	714-492-5311	33°25.51	117°36.50	21
DENNY'S RESTAURANT	529 AVENIDA PICO	SAN CLEMENTE	CA	714-492-2382	33°25.48	117°36.15	22
DOMINOES PIZZA	1502 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-498-9002	33°25.25	117°37.50	23
EASTERN WINDS	201 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-492-3008	33°25.01	117°37.05	24
EL CAMINO TACOS	420 S. EL CAMINO REAL	SAN CLEMENTE	CA	714-366-8358	33°25.10	117°37.25	25
EL JEFE CAFE	106 E. ESCALONES	SAN CLEMENTE	CA	714-492-4010	33°25.25	117°37.03	26
EL MIRADOR	301 N. EL CAMINO REAL	SAN CLEMENTE	CA	714-366-0855	33°25.08	117°37.10	27

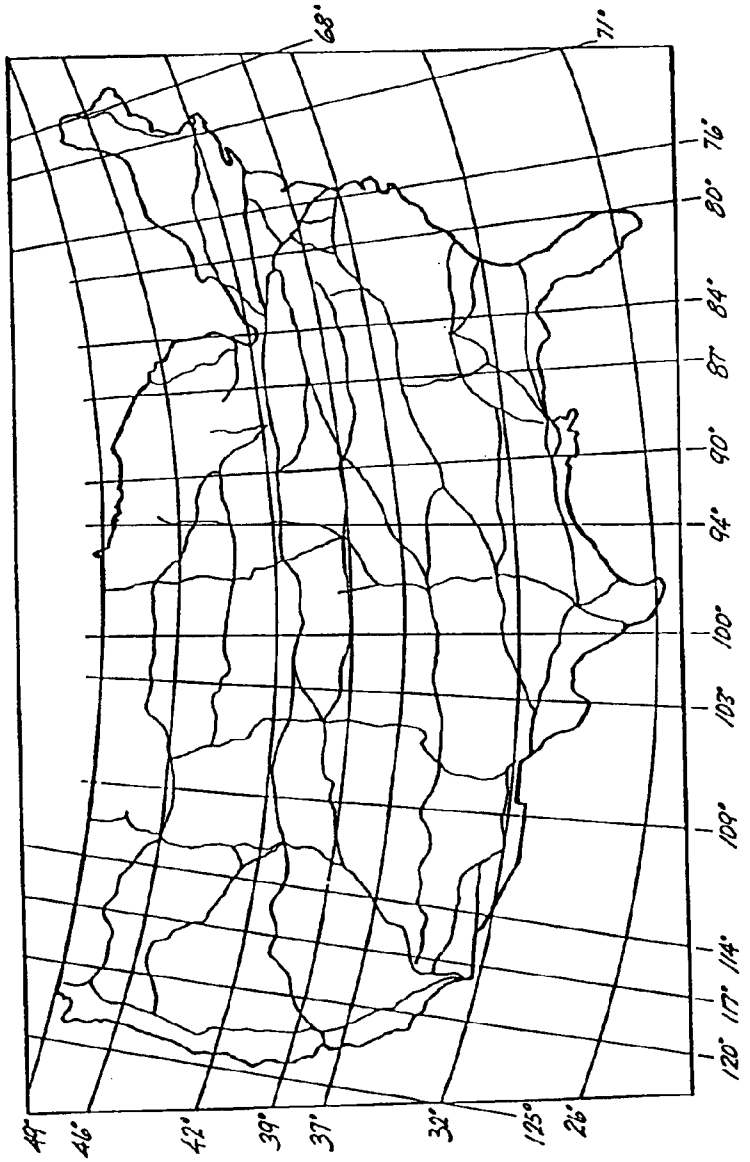


Fig. 21

1115

- LONGITUDE AND LATITUDE COORDINATES.
- AREA CODE BOUNDARIES.
- ZIP CODE BOUNDARIES.
- NATIONAL PARK BOUNDARIES.
- METRO TRAFFIC ZONES
- INTERSTATE BOUNDARIES
- US HIGHWAY BOUNDARIES
- STATE ROUTE BOUNDARIES
- CITY, COUNTY, STATE, PROVINCE BOUNDARIES.
- POLITICAL BOUNDARIES.
- ECONOMIC, RETAIL, BUSINESS ZONE BOUNDARIES.

GPS EMBODIMENTS ARE NOT LIMITED TO THE ABOVE EXAMPLES AND MAY INCLUDE MANY OTHER SYSTEMS USING VARIOUS RECORDING TECHNIQUES

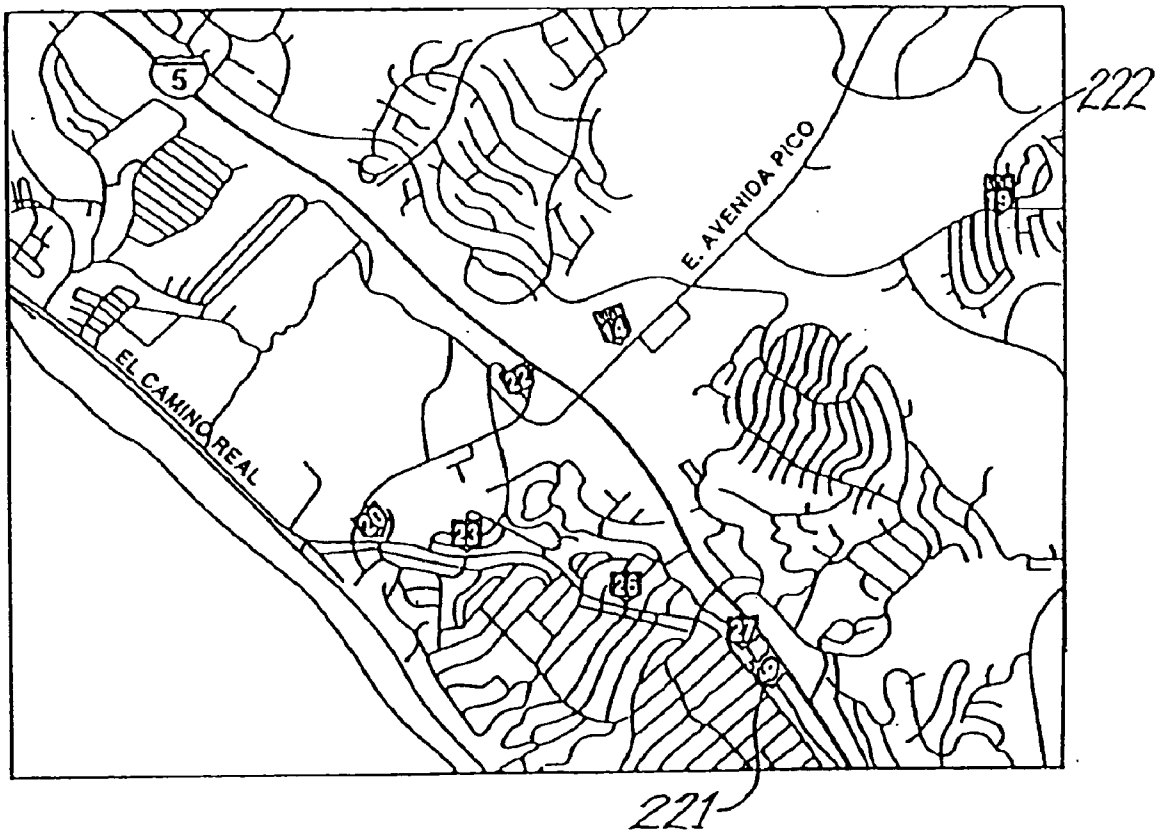


Fig. 22

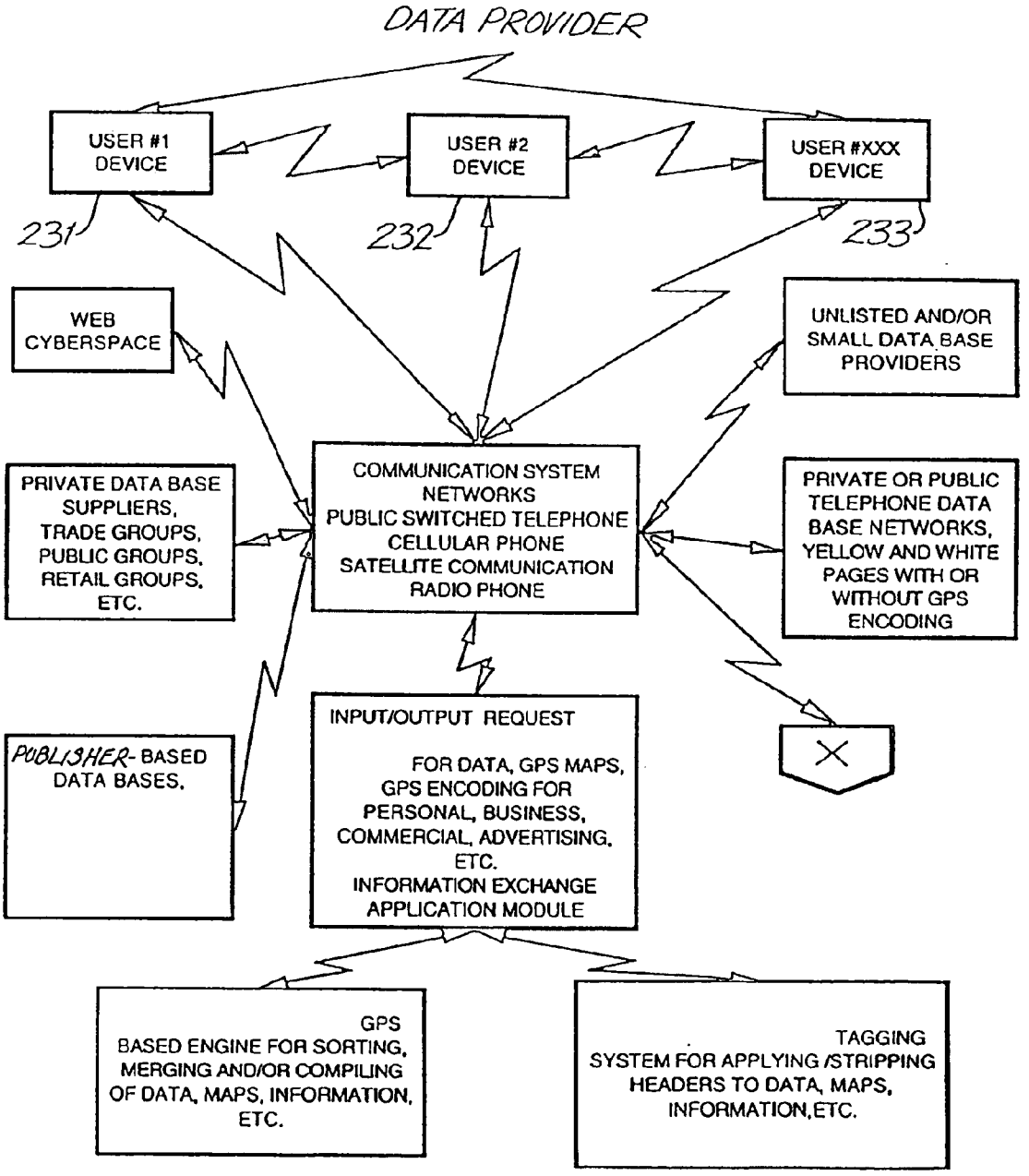

DATA PROVIDER
USER #1 DEVICE
USER #2 DEVICE
USER #XXX DEVICE
231
232
233
WEB CYBERSPACE
UNLISTED AND/OR SMALL DATA BASE PROVIDERS
PRIVATE DATA BASE SUPPLIERS, TRADE GROUPS, PUBLIC GROUPS, RETAIL GROUPS, ETC.
COMMUNICATION SYSTEM NETWORKS PUBLIC SWITCHED TELEPHONE CELLULAR PHONE SATELLITE COMMUNICATION RADIO PHONE
PRIVATE OR PUBLIC TELEPHONE DATA BASE NETWORKS, YELLOW AND WHITE PAGES WITH OR WITHOUT GPS ENCODING
PUBLISHER- BASED DATA BASES.
INPUT/OUTPUT REQUEST
FOR DATA, GPS MAPS, GPS ENCODING FOR PERSONAL, BUSINESS, COMMERCIAL, ADVERTISING, ETC.
INFORMATION EXCHANGE APPLICATION MODULE
GPS BASED ENGINE FOR SORTING, MERGING AND/OR COMPILING OF DATA, MAPS, INFORMATION, ETC.
TAGGING SYSTEM FOR APPLYING /STRIPPING HEADERS TO DATA, MAPS, INFORMATION, ETC.

Fig. 23A

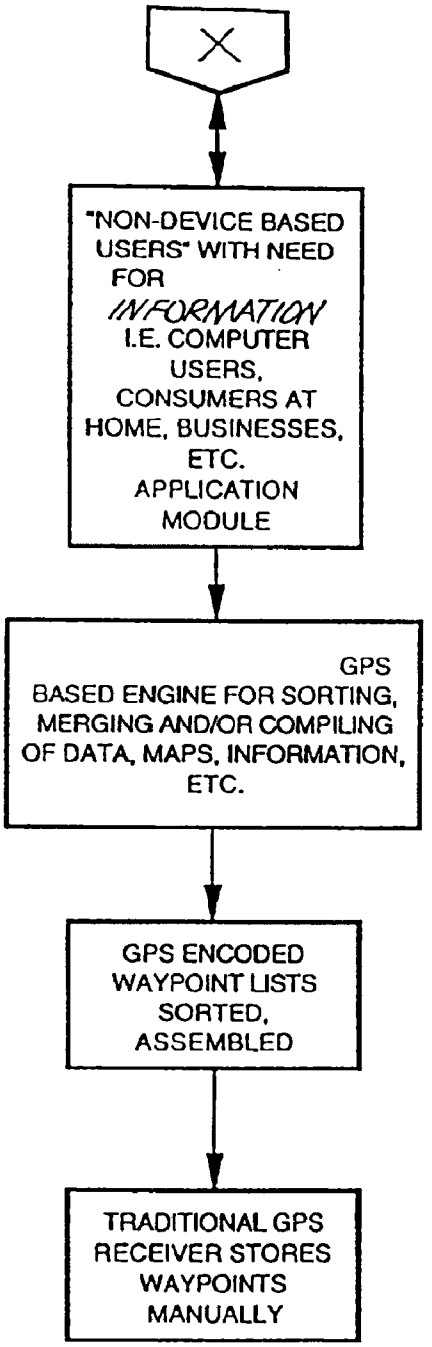

X
"NON-DEVICE BASED USERS" WITH NEED FOR INFORMATION I.E. COMPUTER USERS, CONSUMERS AT HOME, BUSINESSES, ETC. APPLICATION MODULE
GPS BASED ENGINE FOR SORTING, MERGING AND/OR COMPILING OF DATA, MAPS, INFORMATION, ETC.
GPS ENCODED WAYPOINT LISTS SORTED, ASSEMBLED
TRADITIONAL GPS RECEIVER STORES WAYPOINTS MANUALLY

Fig. 23B

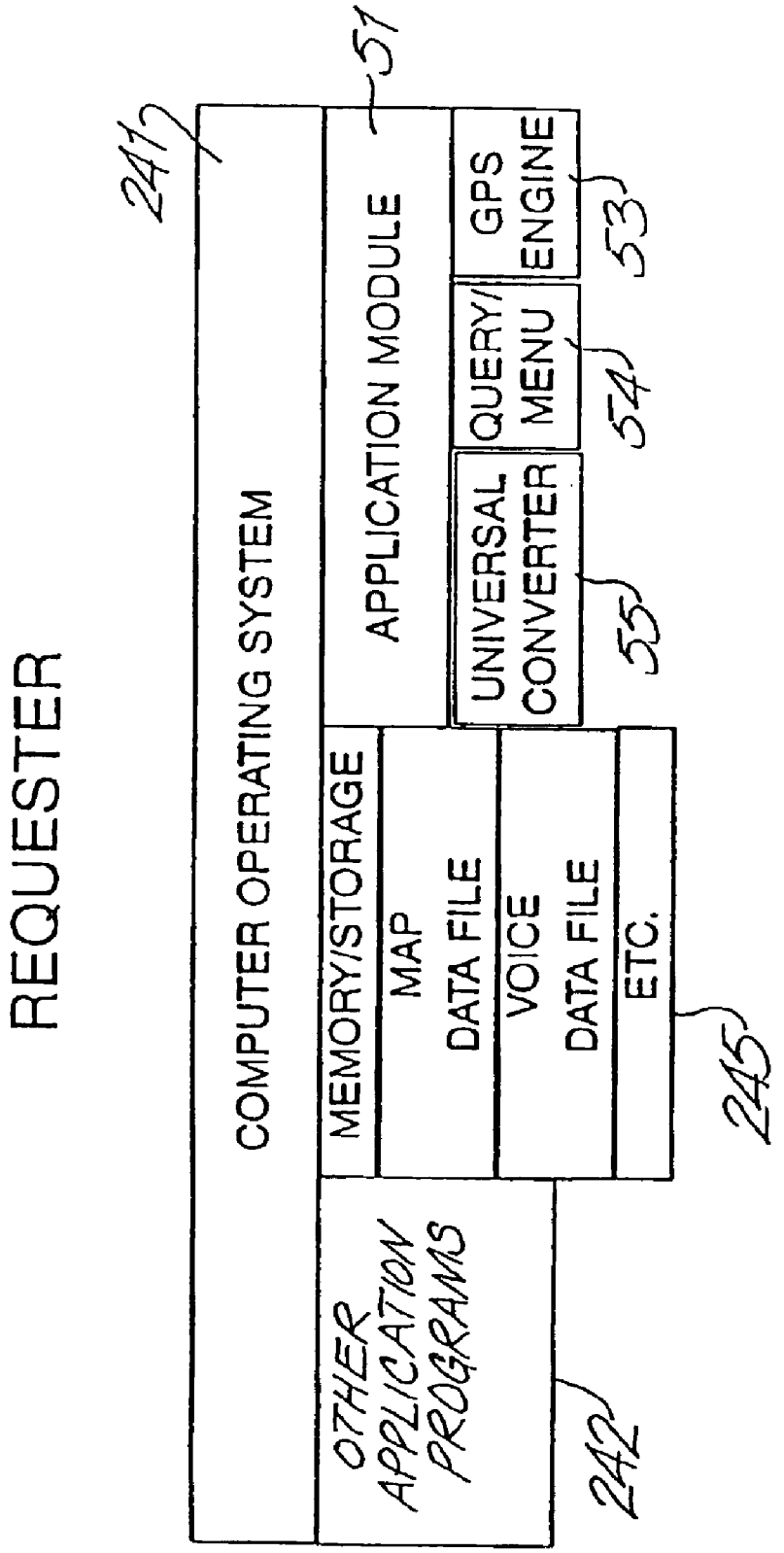

REQUESTER
241
COMPUTER OPERATING SYSTEM
51
APPLICATION MODULE
GPS ENGINE
53
QUERY/ MENU
54
UNIVERSAL CONVERTER
55
MEMORY/STORAGE
MAP DATA FILE
VOICE DATA FILE
ETC.
245
OTHER APPLICATION PROGRAMS
242

Fig. 24

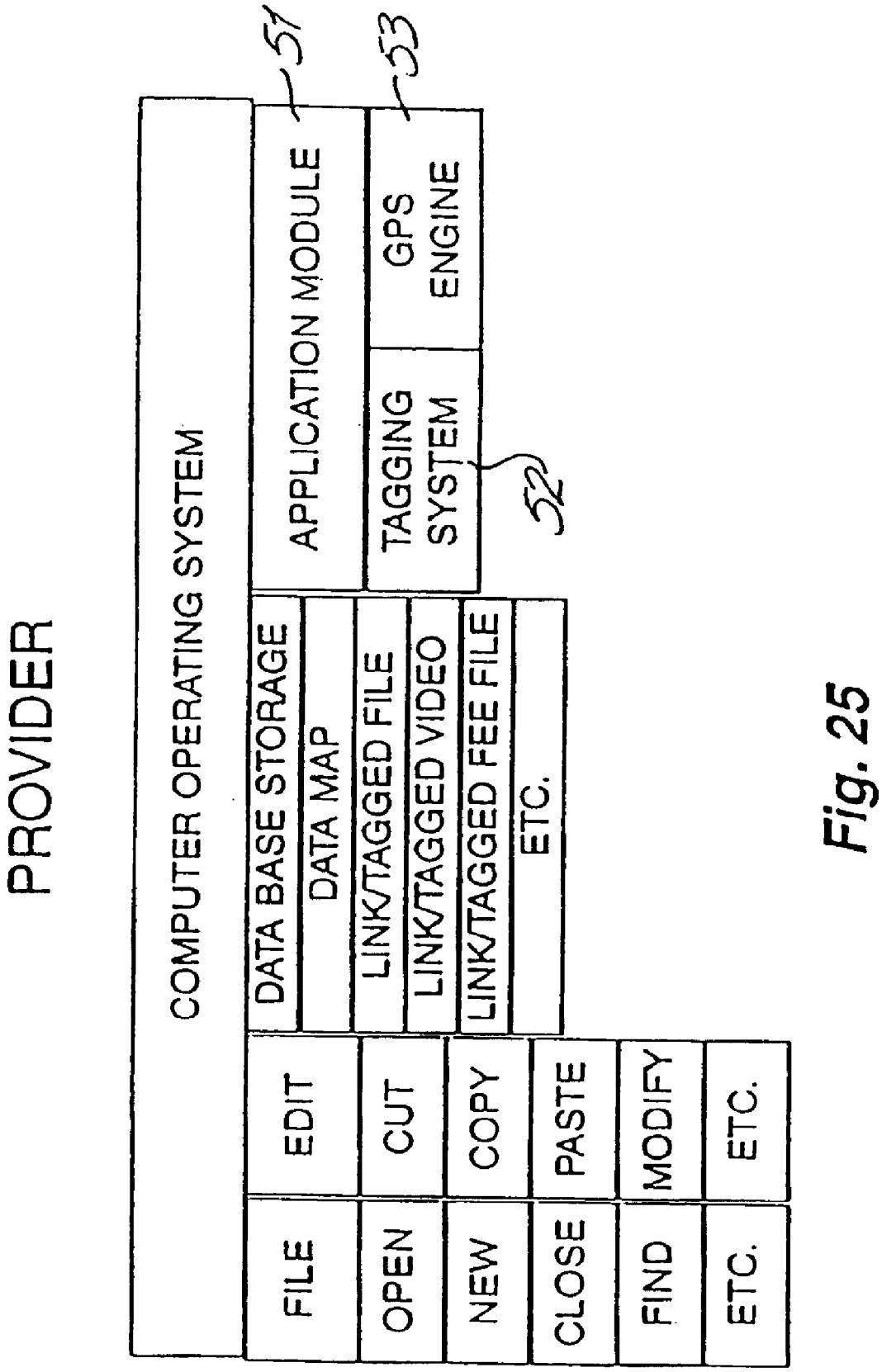

PROVIDER
COMPUTER OPERATING SYSTEM
APPLICATION MODULE
51
GPS ENGINE
53
TAGGING SYSTEM
52
DATA BASE STORAGE
DATA MAP
LINK/TAGGED FILE
LINK/TAGGED VIDEO
LINK/TAGGED FEE FILE
ETC.
FILE
EDIT
OPEN
CUT
NEW
COPY
CLOSE
PASTE
FIND
MODIFY
ETC.
ETC.

Fig. 25

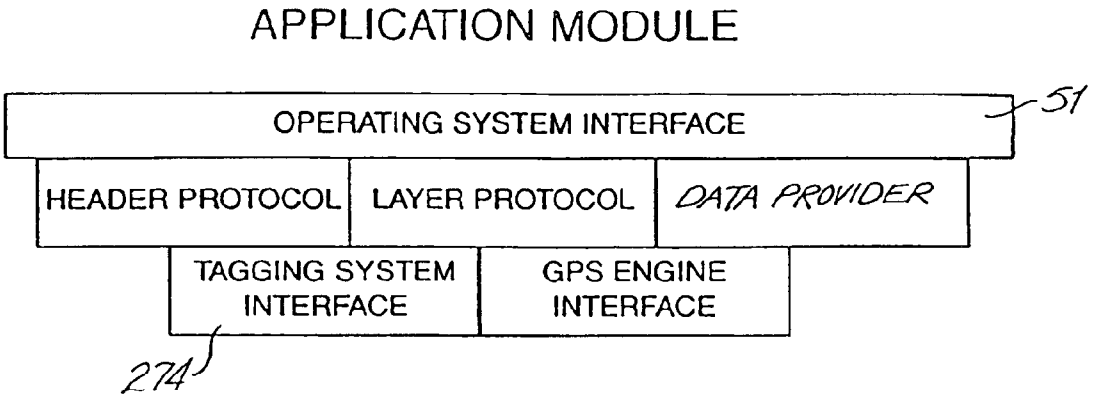

APPLICATION MODULE
OPERATING SYSTEM INTERFACE
51
HEADER PROTOCOL
LAYER PROTOCOL
DATA PROVIDER
TAGGING SYSTEM INTERFACE
GPS ENGINE INTERFACE
274

Fig. 26

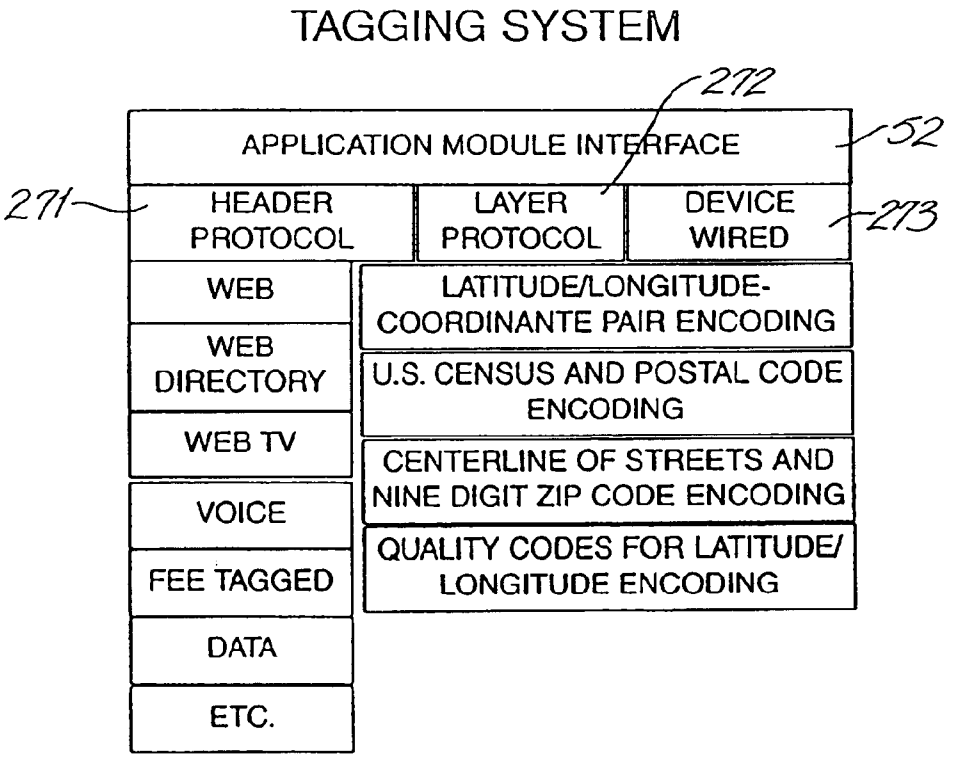

TAGGING SYSTEM
272
APPLICATION MODULE INTERFACE
52
271
HEADER PROTOCOL
LAYER PROTOCOL
DEVICE WIRED
273
WEB
WEB DIRECTORY
WEB TV
VOICE
FEE TAGGED
DATA
ETC.
LATITUDE/LONGITUDE-COORDINANTE PAIR ENCODING
U.S. CENSUS AND POSTAL CODE ENCODING
CENTERLINE OF STREETS AND NINE DIGIT ZIP CODE ENCODING
QUALITY CODES FOR LATITUDE/LONGITUDE ENCODING

Fig. 27

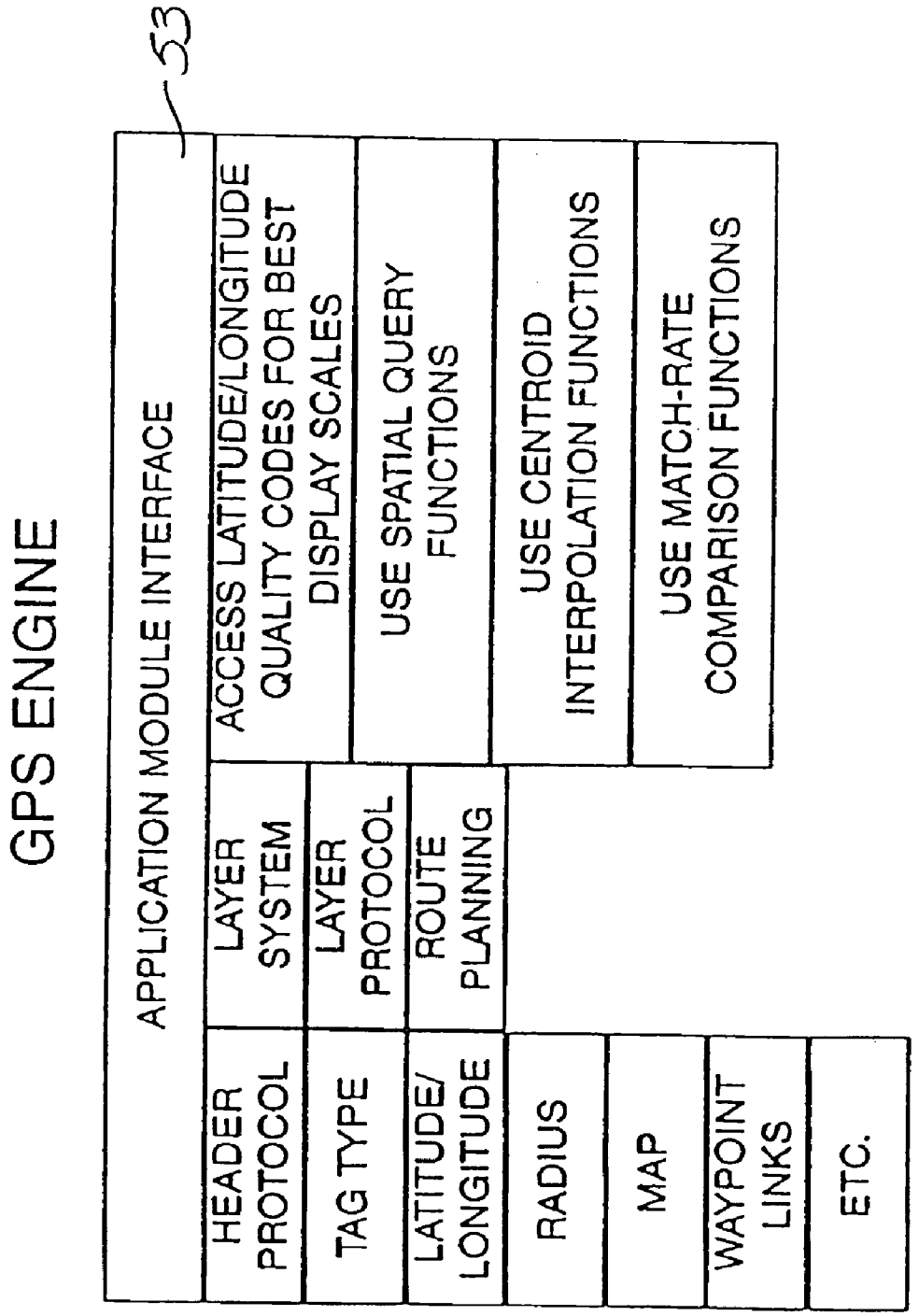

GPS ENGINE
53
APPLICATION MODULE INTERFACE
LAYER SYSTEM
LAYER PROTOCOL
ROUTE PLANNING
ACCESS LATITUDE/LONGITUDE QUALITY CODES FOR BEST DISPLAY SCALES
USE SPATIAL QUERY FUNCTIONS
USE CENTROID INTERPOLATION FUNCTIONS
USE MATCH-RATE COMPARISON FUNCTIONS
HEADER PROTOCOL
TAG TYPE
LATITUDE/ LONGITUDE
RADIUS
MAP
WAYPOINT LINKS
ETC.

Fig. 28

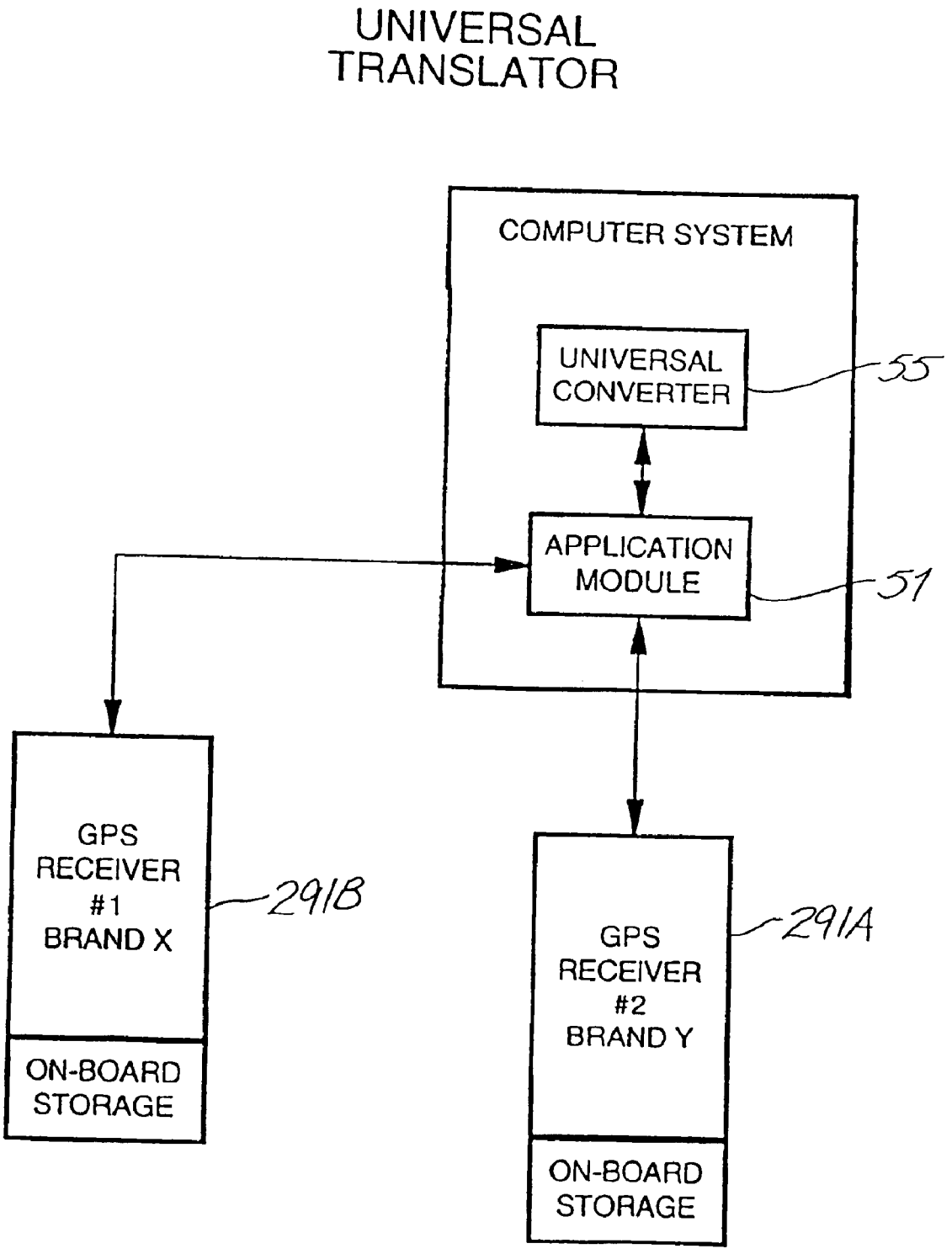

UNIVERSAL TRANSLATOR
COMPUTER SYSTEM
UNIVERSAL CONVERTER
55
APPLICATION MODULE
51
GPS RECEIVER #1 BRAND X
291B
ON-BOARD STORAGE
GPS RECEIVER #2 BRAND Y
291A
ON-BOARD STORAGE

Fig. 29

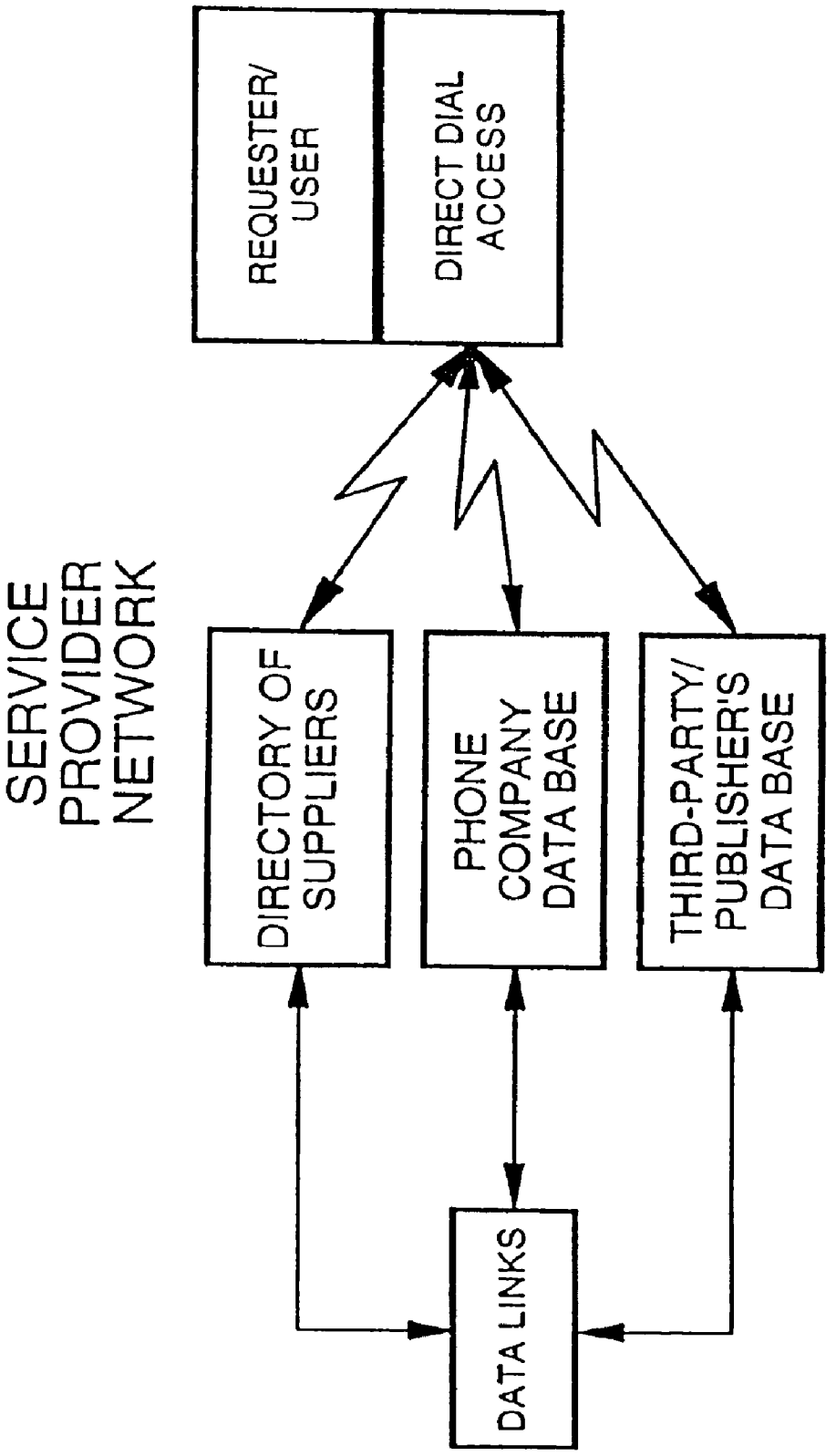

REQUESTER/ USER
DIRECT DIAL ACCESS
SERVICE PROVIDER NETWORK
DIRECTORY OF SUPPLIERS
PHONE COMPANY DATA BASE
THIRD-PARTY/ PUBLISHER'S DATA BASE
DATA LINKS

Fig. 30

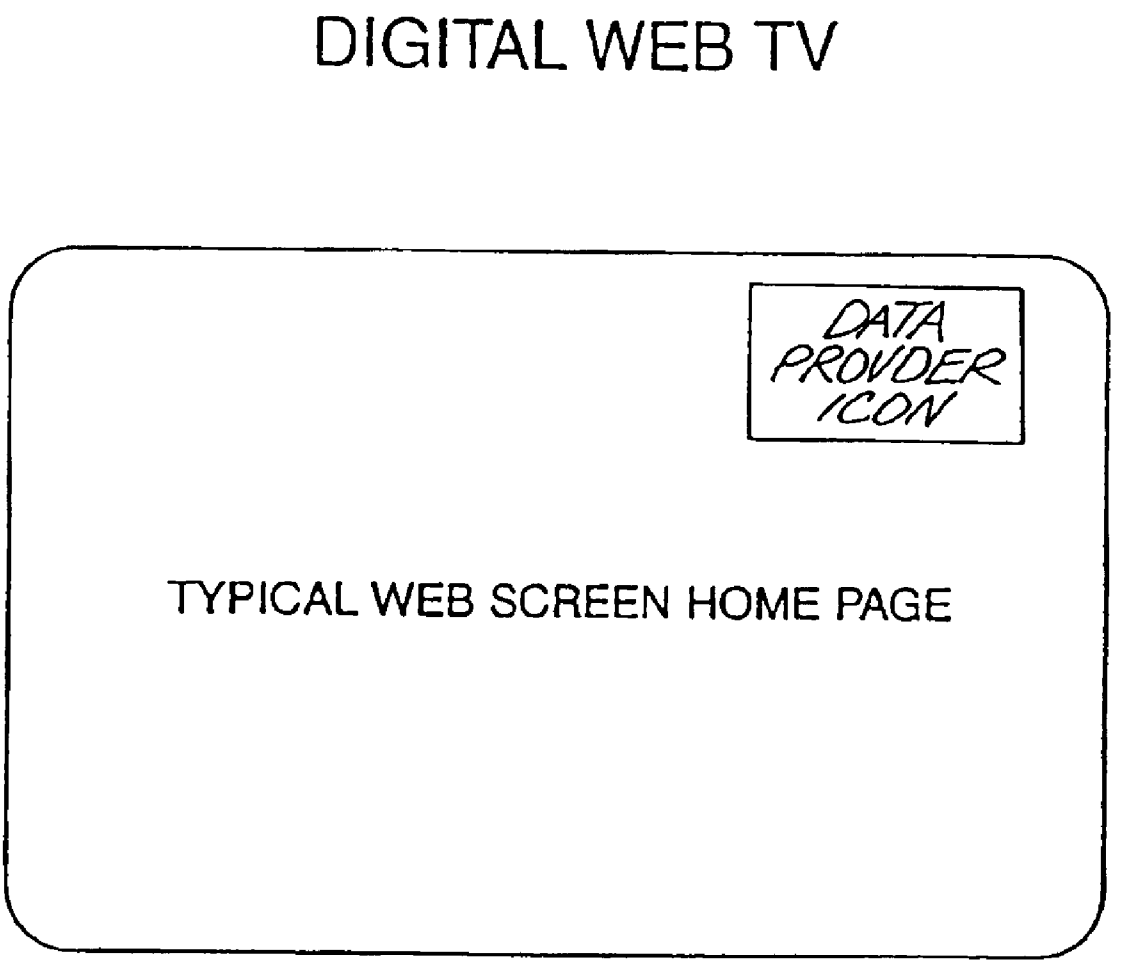

DIGITAL WEB TV
DATA PROVDER ICON
TYPICAL WEB SCREEN HOME PAGE

Fig. 31

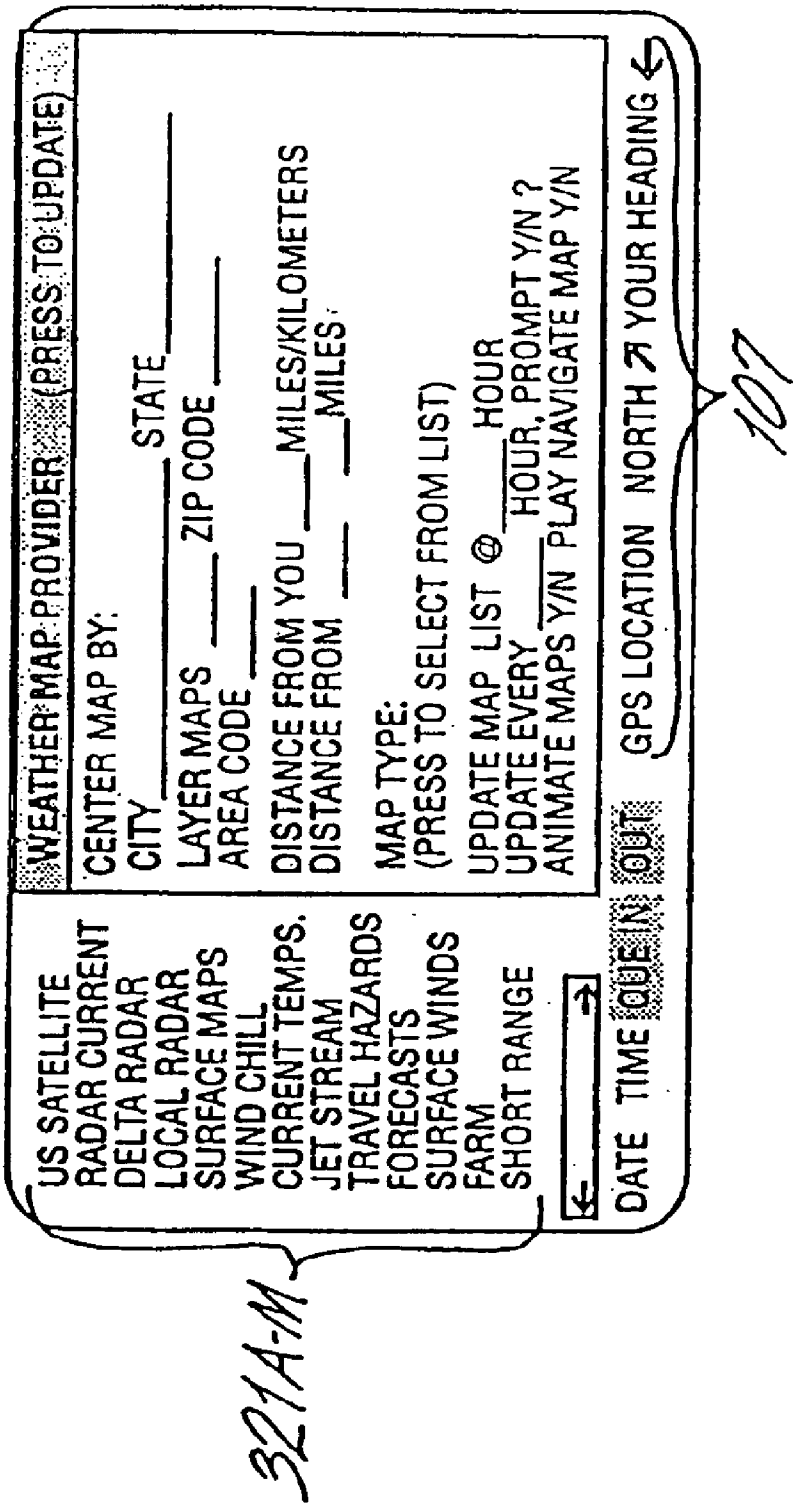

WEATHER MAP PROVIDER (PRESS TO UPDATE)
CENTER MAP BY:
CITY _____ STATE _____
LAYER MAPS ____ ZIP CODE ____
AREA CODE ____
DISTANCE FROM YOU ____ MILES/KILOMETERS
DISTANCE FROM ____ ____ MILES
MAP TYPE:
(PRESS TO SELECT FROM LIST)
UPDATE MAP LIST @ ____ HOUR
UPDATE EVERY ____ HOUR, PROMPT Y/N ?
ANIMATE MAPS Y/N ____ PLAY NAVIGATE MAP Y/N
US SATELLITE
RADAR CURRENT
DELTA RADAR
LOCAL RADAR
SURFACE MAPS
WIND CHILL
CURRENT TEMPS.
JET STREAM
TRAVEL HAZARDS
FORECASTS
SURFACE WINDS
FARM
SHORT RANGE
DATE TIME QUE IN OUT GPS LOCATION NORTH YOUR HEADING
321A-M
107

FIGURE 32

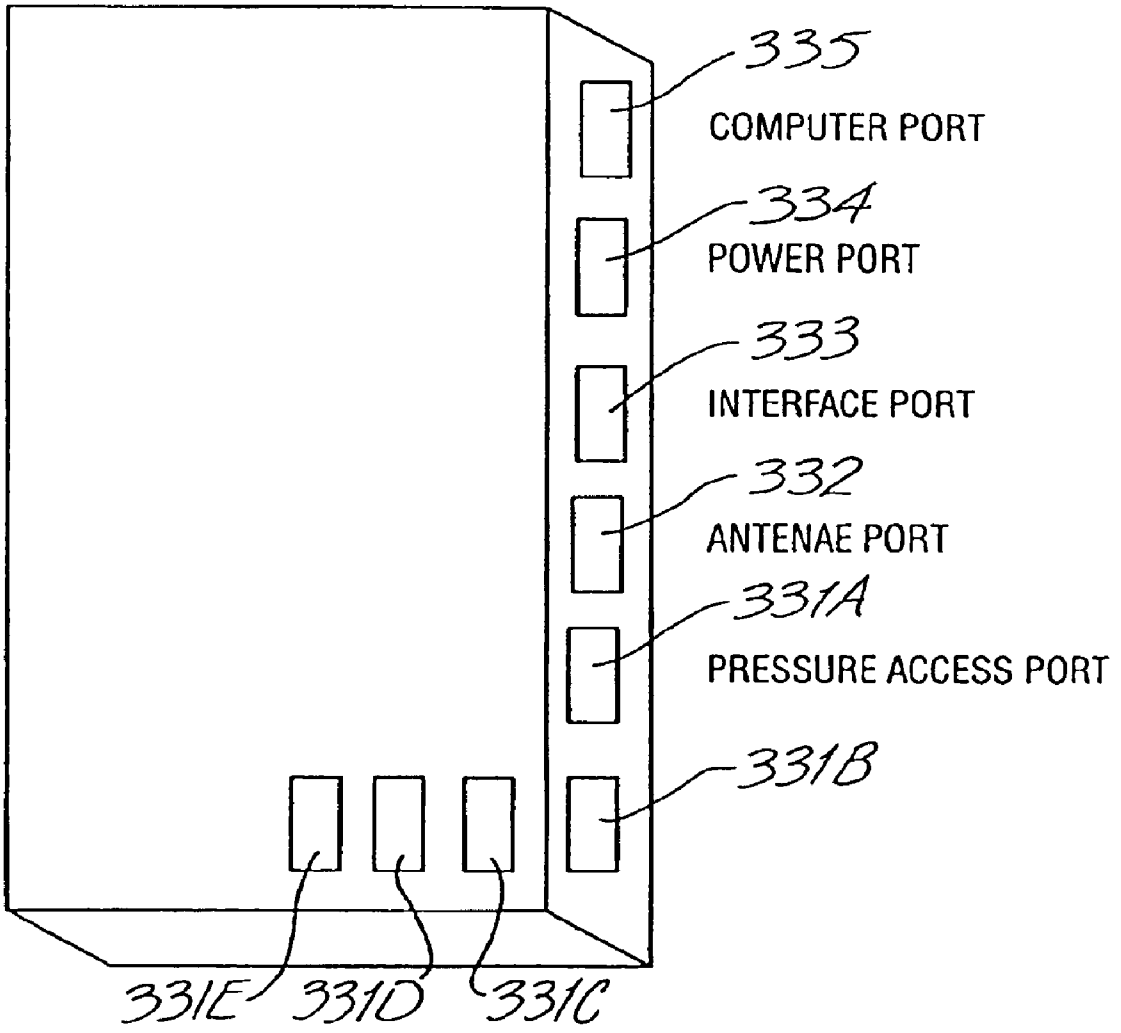

335
COMPUTER PORT
334
POWER PORT
333
INTERFACE PORT
332
ANTENAE PORT
331A
PRESSURE ACCESS PORT
331B
331E
331D
331C

FIGURE 33

PERSONAL COMMUNICATION SYSTEM FOR COMMUNICATING VOICE DATA POSITIONING INFORMATION

CROSS-REFERENCE TO RELATED APPLICATION

The present application is a continuation application of U.S. patent application Ser. No. 09/669,527, filed Sep. 25, 2000 now U.S. Pat. No. 6,529,824, entitled PERSONAL COMMUNICATION SYSTEM FOR COMMUNICATING VOICE DATA POSITIONING INFORMATION", which application is a divisional of U.S. patent application Ser. No. 08/879,955, filed Jun. 20, 1997, now U.S. Pat. No. 6,148,261.

FIELD OF THE INVENTION

The invention relates generally to a system for communicating data including global-positioning-encoded information. In particular, the present invention relates specifically to a device and system for communicating and retrieving position and position related data.

BACKGROUND OF THE INVENTION

Availability of up-to-date information is more important today than ever before and this will continue to be true for the foreseeable future. People want to be well informed, so much so that they travel with cellular phones, beepers, and even portable hand-held Global Positioning System (GPS) satellite receivers.

GPS capable devices generally have a GPS receiver for receiving satellite signals from the GPS satellite network that allow for determination of the device's position. Such devices allow for precisely locating the device in terms of latitude and longitude using the GPS receiver. Some devices have map data stored in memory and a display for showing the device position with reference to the map data. Other devices have no underlying map data base for reference. Rather, they show only the geographic coordinates of the device's location. These coordinates may be referred to as waypoints. Most GPS receiver devices can store many waypoints. Some GPS receiver devices can plot and display a trail of waypoints and store this trail for future retrieval. Sophisticated devices may compute the device's heading, speed, and other information based on comparisons with previous GPS determined positions.

GPS receiver devices with map display capability may store the map information on computer diskettes, CD-ROM's, or other computer memory storage devices. The device location may then be displayed on a display terminal with reference to a map stored in the computer memory storage device. The available quantity of map data, however, can overwhelm the memory capability of easily portable computer devices. This problem is exacerbated when additional information is included and linked with the map data. In addition, information is more valuable when it is up to date and available at the time of consumption, and such devices do not incorporate a means for updating the stored information. By way of example, a CD ROM could never maintain an up-to-date list of every 5-star restaurant.

Some GPS receiver devices have the ability to communicate over a telecommunications network. These devices do not provide for automatic or semi-automatic dynamic exchange of on-line position dependent or related information. In addition, these devices cannot communicate with third parties in the absence of a uniform data format standard. For example, a cellular-phone-based system comprising GPS location information working in conjunction with proprietary Public Safety Answering Point (PSAP) telephone equipment is known. The device provides personal and medical information on an emergency basis to the proper authorities. Such a device does not allow third parties to communicate, tag, interrogate, limit, designate, modify or share this information amongst themselves for any other use.

To that end, the ability to receive digital data structures with GPS encoding, and storing this information for eventual use or broadcast to third parties, would be valuable. Today, the U.S. and several other countries have independent publishers busily GPS mapping everything down to the most minute detail. Most of these data bases are available on CD ROM storage. The problem is that no one data base can contain enough information to fulfill the unique requests of every particular and picky consumer. The costs associated with providing and maintaining such a large data base would be overwhelming and over-burdening. Additionally, most consumers do not like reading or compiling vast data bases.

SUMMARY OF THE INVENTION

The system of the present invention comprises Personal Communications Devices (PCDs), and traditional computer systems with GPS engines, routers, and other application programs to request, process, and transmit tagged GPS encoded information. The system, with related applications, can be accessed by device users, traditional computer users, web-site users (cyberspace), data publishers, public or private enterprises or individuals, by means of application programs. The tagged GPS encoded data files can be stored or sent via communication links using AM, FM, spread spectrum, microwave, laser or light beam in free or fiber optic, line-of-sight, reflected, satellite, secure or non-secure, or any type of communications between multiple points that the application or the state-of-the-art may allow. The system is a waypoint tag and interrogation system using various protocols to answer requests and provide GPS-encoded information. The applications use GPS devices, engines, routing and encoding for access to specific requester-designated data retrieval requests. The applications access fax machines, beepers, telephones and other communication linked devices. The system accesses computer and storage systems with various applications in order to provide this information from a plurality of providers. The system thereby eliminates or reduces the need for large storage devices and interchangeable storage modules.

One embodiment of the present invention includes a requesting device, a data provider (hardware and software), a user, tagger applications or GPS engine and router system with protocols for encoding, tagging, modifying, interrogating, arranging, limiting, displaying, sorting, mapping, segregating, sending, receiving and updating waypoint and the waypoints connected data structures with digital or graphic maps, digital voice files, linked digital web files properly encoded and tagged by way of specific devices, or by traditional computer and storage systems.

The application programs contain protocols for users, providers, taggers, list maintenance organizations, and others, and will use a dynamic identification system from applications containing GPS search engines, route planners, compilers, designators, publishers, and others to permit communication of information.

The PCD is a cellular-phone-sized electronic device, combining the capabilities of a GPS receiver, transceiver, digital beeper, cell phone and projection system into one

compact unit. The PCD is capable of uploading emergency information (medical, police alert, etc.) via a one-push button that phones 911 or a security monitoring center similar to those used for house alarms. The alert continues to be broadcast until a response is made.

The PCD is also capable of downloading information via a request to a data provider, similar to a request for directory information from a phone company or other service. In this mode the PCD acts similar to calling a phone operator for information. However, in this instance, no human contact is required. The caller requests specific information (location of gas stations, names of restaurants, local banks, etc.) via a voice command ("Download e.g., Wells Fargo Banks") or via digital commands using a keypad or other input device and the requested information is automatically downloaded to and stored in the memory of the user's PCD. This information can be accessed off-line via the screen on the PCD. It is all done digitally, eliminating having to write down information such as name, address, location map, GPS latitude and longitude encoding, direction and distance to location, hours of operation, or other items of information. The PCD can be plugged into an automobile input port or similar device, if available, and provide distances and directions to locations of interest. Similar information of a condensed nature can also be provided to the user via the screen of the PCD. The user is not required to be a subscriber to some proprietary system, instead the PCD can use any means to access any data base from any potential provider, whether GPS encoded or not.

In some areas the information would be sent and received by way of a Local Area Broadcast via radio frequency signals to each home, car or PCD within a reception area. In such an embodiment, users are able to access companies listed on the broadcast network from data providers of properly tagged, yellow page-type information or are provided with GPS encoded information and maps similar to web page listings. This would be advantageous to small towns with little information available for travelers, but which have an interest in providing up-to-date traffic, weather and travel advisories to benefit the local community and businesses. Such a system does not require a master, home or base unit. The providers of data base or advertising information could be a single data provider and could also be individual users with application programs that allow provision of such data. The application programs provide a means for sending and receiving data, GPS encoded data and graphics encoded data. The application programs can also act as a universal coder/decoder to other proprietary GPS data bases.

The present invention allows users to request detailed information relating to their present location as well as information related to distant locales. Some of the advantages provided by the invention include:

1. Information can be received digitally by a PCD user from any system.
2. Multiple requests can be retained, stored or resent.
3. In-depth dynamic data retrievals are possible and could be viewed later.
4. GPS tagging and encoding with latitude and longitude information along with encoded maps for navigation.
5. Small non-contiguous map segments are possible.
6. On-line storage of data personal and other information, along with GPS encoded maps on some data files.
7. Display menus, interfaces and applications can be viewed on heads-up display systems in automobiles, homes, businesses and various commercial applications.
8. Allows for portable Internet access.
9. Provides a means for an Internet based telephone directory access tagged and linked to the originating area code and phone numbers.

Remote and distant third parties could communicate with each other and, by sending and receiving GPS encoded data, can meet or find each other in remote locations. Maps and other digital data may be transmitted/received by fax, beeper (receive only), computer, phone and radio.

One embodiment of this invention would include a system of non-subscribers communicating to each other in a similar fashion, without the use of base stations. In addition, the non-subscribers could send personal data bases with maps included, GPS information, and other information of non-related data or graphics from publishers of any such data base. In this embodiment the device would act as a transceiver, sending and receiving dynamic moving waypoint information in digital formats, including maps of various sizes and embodiments.

The PCD can display a singular or a plurality of images and displays, project an image on to a screen or viewing surface, store or communicate data (depicted as a line, graphic, icon, etc.) to and/or receive latitude and longitude data from third parties. Additionally, the device can send/receive latitude- and longitude-encoded maps and other data to/from a third party, send/receive standard or non-standard phone and fax communications (AM, FM, spread spectrum, microwave, laser or light beam in free or fiber optic, line of sight, reflected, satellite, secure or non-secure, or any type of communications between two points that the application or state-of-the-art may allow), perform computer functions from existing application software and operating systems, receive standard or non-standard beeper messages, interface with a conventional computer and provide an interface to a heads-up display, an external viewing device or any projection system.

An embodiment of this invention incorporates a GPS transceiver with a designated application used with a communication system or network. Several users of this invention can communicate and send data, maps and graphic files with or without GPS encoding. By example, a user could request from another party a map of walking trails of Yosemite Valley with latitude and longitude designations properly GPS encoded. This map may not be in the requesting user's data base or in a large number of subscriber's or non-subscriber's data bases. This highly stylized map and encoded information, of a possible non-uniform nature, could be on just one user's PCD device or external source. The requesting user could contact the specialized source for specific information, and be sent via a communication link, the specific data, this data could then be modified by the user and sent back to the original provider.

The preferred embodiment of the PCD and system provides a means for requesting and receiving data files which can be tagged, modified and interrogated. This data can be comprised of many different formats and applications with potentially unique compilations from potentially unrelated, (non)-subscribers or (non)-linked users. These users can communicate with commercial, business and personal computer systems and devices having the capability of running an application (or applications) and having the ability to request and provide waypoint information which can be tagged, modified and interrogated.

Another preferred embodiment of this invention provides a means for decoding tagged, modifiable and interrogatable maps and data files furnished by third parties for display on the user's PCD or traditional computer devices.

In one embodiment of the device and tagging system the GPS information is communicated from locations, homes, businesses, commercial designations, government resources, public and private areas, cyberspace and other communication systems. Various designated locations, or a plurality and multiplicity of locations, or data structures, are assigned as waypoints. These waypoints could be tagged, or interrogated from an application program which describes, encodes, reports, modifies and communicates this encoded information and data from any location. In addition, the transmitting device may report a plurality and multiplicity of locations or events unrelated to either the location of either the transmitting or receiving device. Indeed, the device could communicate to many unlinked, unreported or unconnected waypoints and send active dynamic information to the requester. Cyberspace providers may enter the network web system, use applications for device communications and participate in the exchange of information using designated GPS engines and applications. By way of example, the invention can provide a requester with dynamic advertisements encoded with maps, location information, or other data to a location anywhere in the U.S. Indeed, tagged files which are linked can be sent from a third-party publisher located in another state.

The system is similar to the world wide web, except the web does not use GPS engines, applications, tagging systems, etc. By way of example, one difference is that the invention uses GPS devices, engines, applications and encoding for access to specific requester designated data retrieval techniques. The invention provides a means to locate specific individuals or places using standard GPS search techniques.

The system includes the concept of storing data, including voice messages. The system encodes files for use in a location tagged data format system. Users can request and compile information and store the information on remote computer systems. Certain protocols for compilation, encoding and tagging data files may be desirable in order to create files for system usage.

An embodiment of the invention uses fax, beepers, telephones, and/or computer and storage systems with application programs to properly GPS encode, tag, modify and interrogate requests and provide same from a plurality of providers. An embodiment of the invention includes applications or GPS engine systems for encoding, tagging, modifying, interrogating, arranging, limiting, displaying, sorting, mapping, segregating, sending, receiving and updating waypoints and its connected data structures with maps, or by any other means by way of specific devices, or by traditional computer and storage systems.

Another advantage the invention provides is a means to display this type of information and a means to store data unrelated to any interrogation by the PCD device. Methods of display include multiple of displays including, by example, overhead displays, heads-up displays, projection systems, LCD displays, computer displays or any past or future designed displays whether connected directly or by some electromagnetic means. The preferred embodiment of the device could include any means of display or combinations thereof. In addition, the device could include many control devices such as remote control, remote mouse type devices and any combination of keyboards.

Further objects, features and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings showing an illustrative embodiment of the invention in which like parts are designated by like reference numerals throughout.

DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a GPS transceiver system and communication links incorporating the present invention;

FIG. **2** is a front perspective view of a PCD of the present invention showing a layout of controls and an initialization screen;

FIG. **3** is a rear view of the PCD of FIG. **2**;

FIG. **4** is a block diagram of the PCD of FIG. **2**;

FIG. **4**A shows a screen menu hierarchy of the PCD of FIG. **2**;

FIG. **5**A illustrates a flow chart depicting the program sequence for the entry of a personal identification number (PIN) and personal data into the PCD of FIG. **2**

FIG. **5**B illustrates a flow chart depicting the program sequence for the user to select a mode of operation using the PCD of FIG. **2**;

FIG. **5**C illustrates a flow chart depicting the program sequence for the user to control the GPS mode of the PCD of FIG. **2**;

FIG. **5**D illustrates a flow chart depicting the program sequence for the user to control the phone mode of the PCD of FIG. **2**;

FIG. **5**E illustrates a flow chart depicting the program sequence for the user to control the computer mode of the PCD of FIG. **2**;

FIG. **5**F illustrates a flow chart depicting the program sequence for the user to control the radio mode of the PCD of FIG. **2**;

FIG. **6** illustrates the Main Menu page of the PCD of FIG. **2**;

FIG. **7** illustrates the select GPS Function page of the PCD of FIG. **2**;

FIG. **8** illustrates the GPS: Location page of the PCD of FIG. **2**;

FIG. **9** illustrates the GPS: Show Me page of the PCD of FIG. **2**;

FIG. **10** illustrates the GPS: Get Map page of the PCD of FIG. **2**;

FIG. **11** illustrates the GPS: Third Party page of the PCD of FIG. **2**;

FIG. **12** illustrates the FAX page of the PCD of FIG. **2**;

FIG. **13** illustrates the Beeper page of the PCD of FIG. **2**;

FIG. **14** illustrates the Phone page of the PCD of FIG. **2**;

FIG. **15** illustrates an Information Request page of the PCD of FIG. **2**;

FIG. **16** illustrates the Computer page of the PCD of FIG. **2**;

FIG. **17** illustrates the Radio page of the PCD of FIG. **2**;

FIG. **18** illustrates the Receive Queue page of the PCD of FIG. **2**;

FIG. **19** illustrates the Send Queue page of the PCD of FIG. **2**;

FIG. **20** illustrates a typical listing downloaded from a data provider;

FIG. **21** illustrates a typical GPS encoded map downloaded from a data provider;

FIG. **22** illustrates a typical GPS encoded map with waypoints locating restaurants within a specified radius;

FIG. **23**A illustrates an exemplary data provider;

FIG. **23**B illustrates an exemplary configuration of a non-PCD computer utilizing a modified application module;

FIG. **24** illustrates a software module configuration of a requester;

FIG. **25** illustrates a software module configuration of a provider;

FIG. **26** illustrates a software module configuration of the application module;

FIG. **27** illustrates a software module configuration of the tagging system;

FIG. **28** illustrates a software module configuration of the GPS engine;

FIG. **29** illustrates a software module configuration of the universal translator;

FIG. **30** illustrates a typical configuration of the service provider;

FIG. **31** illustrates a possible configuration of the digital web TV;

FIG. **32** illustrates the Weather Map Request page of the PCD of FIG. **2**; and

FIG. **33** illustrates a weather reporting device.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** shows a system capable of communicating using the electromagnetic energy spectrum, traditional computer networks, cellular phone networks, public telephone networks, and satellite system networks. The major components of the system comprises personal communication devices (PCDs) **20** and one or more of the following: a cellular phone network **60**, a standard phone line network **70**, an electromagnetic energy spectrum network **80** and/or a computer network **90**. The PCD receives signals from a GPS satellite system **10**.

FIG. **2** illustrates a PCD of the present invention. The PCD has a display **28***a*. The display may be of a LCD type or other types known in the art. Incorporated with the display is a touch screen input device **28***b*, which are known in the art. The PCD also has a alphanumeric key pad **26**, which includes many of the standard keys generally found on computer keyboards. The location of the keys, and the selection of the characters used on a single key, may be varied as desired. The PCD also has specialized keys **27***a–g*, n related to GPS, telecommunications, and other functions. Located on one side of the PCD are a number of input and output ports. In the embodiment shown, these ports include a modem output port **29***g*, a generalized communication port **29***f*, a power port **35***b*, an infrared port **29***e*, and a heads-up display interface port **25***k*.The location of these ports are shown for descriptive purposes only, the specific location of these ports on the PCD is not critical. The power port allows the PCD to be operated from an external power source (not shown). The communication port allows the PCD to be connected to printers, local computer networks, and the like.

FIG. **3** shows a rear view of the PCD of FIG. **2**. The rear of the PCD contains a microphone **34** towards one edge of the rear of the PCD and a speaker **33** towards the opposing edge. The layout of the microphone and the speaker is similar to that found in portable cellular telephones. An antenna **32** extends from the edge near the speaker to allow for communication in a cellular telephone network or via other electromagnetic spectrum means. The PCD contains a battery **38***a*. The battery allows for mobile operation of the PCD and is the selected power source if an external power source is not available through the power port. The PCD's operation is governed by a processor **21**. A variety of microprocessors may be used, with the selection of such determined by processing power, power utilization, and other factors and requirements. The PCD has a slot **23** for a PCMCIA card, CD-ROM, or other computer accessory. The PCD is powered on when the power button **31** (shown in FIG. **2**) is depressed. In the embodiment shown, at initial device power on, the processor causes the PCD to display the initialization screen **100** (shown in FIG. **2**).

FIG. **4** shows a block diagram of the PCD. Control and logic functions are performed by the processor **21**. Internal data storage **22**, which is provided by conventional memory such as RAM or ROM or variations thereof, may be accessed by the processor. The processor may also access removable data storage devices **23** such as a hard disk installed via the PCMCIA slot, a CD-ROM type device or other similar removable data storage devices. The processor is connected by a data bus **24** to a number of devices. These include the alphanumeric key pad and other special purpose keys, the touch screen, and other hard wired input devices. The heads-up display output port and the display screen are also connected via the data bus to the processor, it being recognized that a number of display related devices such as VGA cards, chips, and the like are also required to implement the display device functions and the other previously mentioned functions. The microprocessor may also access or control communications with telephone networks, either hardwired or cellular, radio transmissions, infra-red transmissions, or communications with other computer devices.

All known verbal commands from GPS systems can be implemented and attachment or inclusion of voice activation for map instructions relative to location, GPS and street designations, including heading descriptions, distance, and arrival time estimates can be included.

FIG. **24** illustrates a block diagram of the PCD's software components. An application module or program **51** interfaces with the PCD's operating system **241**. The operating system may be DOS, UNIX, Windows 95, Windows NT, O/S2 Apple McIntosh, Next Computer, or other operating systems, including operating systems well suited to devices with constrained memory or other limitations due to the small physical size of the PCD. The operating system additionally interfaces with other application programs **242** that provide standard file edit and other functions typically found in personal computers. The operating system, or other application programs interfacing with the operating system, provide for maintenance of data bases **245** used by the PCD. The application module includes a GPS engine **53** providing GPS functions, including interfacing with the GPS receiver **243** (shown in FIG. **4**). A query menu program **54** of the application module controls the graphical user interface and related functions for the device. Included in the application module is a universal converter **55**.

As illustrated in FIG. **29**, the universal converter enables the PCD to read in data provided by third parties **291***a, b* and convert or filter such data to a format useable by the PCD. The universal converter first inspects the received data to determine if the data is in a known format which can be converted to the format used by the PCD. If the format is not known by the device, the universal converter attempts to extract any ASCII data or format the data as a bit map as appropriate.

As illustrated in FIG. **26**, the application module further includes programs to implement data formatting and communication protocols using header protocols **271**, layer protocols **272**, and data provider protocols **273**. The application module also includes a tagging system interface

program **274**. The elements of the tagging system are illustrated in FIG. **27**. The purpose of the tagging system is to provide a common universal data structure for requests and responding to requests. Various techniques common in the GEO coding industry, using U.S. Census bureau data and tiger files with certain modifications, can establish parameters for software suppliers to use latitude and longitude encoding as coordinate pairs, postal code encoding and street centering encoding, all for the benefit of accuracy in designating certain files as "tagged". The tagging system provides the ability to apply and strip header and layer information to and from data files.

FIG. **4**A shows the top level page menu display hierarchy of the PCD. At initial power on the initialization page **25***a* (shown in FIG. **2**) is displayed. The initialization page allows for the entry of a personal identification number and other data. Depressing the home button **27**E (shown in FIG. **2**) displays the Main Menu page **25***b*. A number of additional pages are available from the Main Menu page. These include the GPS **25***c*, Fax **25***d*, Beeper **25***e*, Phone **25***f*, Computer **25***g*, Radio **25***h*, Send Queue **25***i*, and Receive Queue **25***j* pages.

FIG. **5**A lists a sequence for the operator of the PCD to answer certain questions, provide information for future access regarding handling of emergency events and handling of same by civil authorities or private individuals empowered to act on behalf of the operator. Access is denied or provided based upon user codes. The entry of a user code may allow for limited to full access of the data stored in the device and usage of same with different codes providing different levels of access and usage. Similar information and sequencing is provided by the application modules and operating system for medical and other information in the event of emergencies. In one embodiment of the preferences screen (not shown) information can be displayed in a specified manner, events recorded and equipment options listed. Specific usage of the device and furnished software would be recalled by each user having access and user codes to operate the PCD, each user having unique individual screens and setups based on that user's preferences. The initial setup of screen preferences and other user configuration details are well known in the art.

Selecting PIN **111** from the Main Menu page displays a screen **113** prompting the user to input a personal identification number. Using an alphanumeric key pad **26**, the user inputs a personal identification number and presses ENTER **27***g*. The processor analyzes the entered personal identification number and determines if the number is valid **115** FIG. If the entered personal identification number is valid the processor enables PERSONAL **121**, MEDICAL **131**, PREFERENCES **141** touch points on the display screen. These touchpoints, and touchpoints later referred to, are selectable either by pressing the display screen at the touchpoint location or by selecting the underlying display item with the cursor. If the PCD already contains personal, medical and preference data, the HOME button **27***e* is enabled. If the personal identification number is not valid, the processor **21** will increase the device security level **119**. This may include, but is not limited to, disabling the PCD operation for a specified time. Selecting PERSONAL **121**, MEDICAL **131** or PREFERENCES **141** touchpoints displays the corresponding pages **123**, **133**, or **143**. These pages request specific data, and allow the user to input data using alphanumeric key pad **26**. Completion of data entry is indicated by pressing the ENTER button **27***g*.

In addition, the Initialization page **100** FIG. **2**, as well as all other pages, displays the time and the date **103**, touch points for QUE IN **550** and OUT **600** (described later in this document) and limited GPS information **107**. The limited GPS information comprises of the user's location (latitude and longitude), an arrow pointing to north and an arrow indicating direction of device travel.

When enabled, pressing the HOME button **27***e* (FIG. **2**) signals the processor to display the Main Menu page **150** FIG. **5**B. As shown in FIG. **6**, the Main Menu page allows the operator to use the touch screen to select the GPS **200**, FAX **300**, BEEPER **350**, PHONE **400**, COMPUTER **450**, RADIO **500**, RECEIVE QUE **550** and SEND QUE **600** touchpoints. The heading and directional information are displayed in real time and are dynamic. Pressing the FAX touchpoint causes the processor to display a Fax page (shown in FIG. **12**) which lists received facsimile messages **301**. The Fax page includes display interfaces appropriate for the sending and receiving of facsimile communications through the FAX Phone Modem port **29***g*, and such displays and functions are well known in the art. Pressing the BEEPER touchpoint causes the processor to display a Beeper page (shown in FIG. **13**). The Beeper page displays received beeper messages **351** and allows for the deletion of such messages from the display and internal memory storage. Also, a sub-menu portion of the display **151** is reserved for sub-menus and directories.

Pressing GPS **200** causes the processor **21** to display a GPS Function page **201**, which is illustrated in FIG. **7**. The GPS page provides for selection of a GPS mode through touch points in the sub-menu portion of the display. The available modes are location **210**, show me **230**, get map **250** and third party **270** modes. The display returns to the GPS Function page when the PREVIOUS button **27***i* (shown in FIG. **2**) is pressed. The display hierarchy for the GPS functions is illustrated in FIG. **5**C. The Location, Show Me, Get Map, and Third Party pages descend from the GPS Menu page. The Location page comprises the current map, the location on the map of the device, and a plot of the trail of the device on the map. The sub-menu portion of the display provides for additional selection of still further pages. These pages include a Menu page, a Mode page, a Waypoint page, and a Preferences page.

The Location page is illustrated in FIG. **8**. The Location page includes a GPS map **219** (latitude and longitude encoded coordinate pairs). The sample page shown is an encoded map showing the device position, plot trail and the encoded map location of the selected waypoint. The map displayed could be from on-board memory or sent by other third parties by way of communication links to the PCD. When map data files are encoded with location information, the location information can be referred to as waypoints. These tagged waypoints, with links to other data structures, can then be sent to users via an application to various communication systems. Closed-loop or proprietary GPS receivers can send/receive data to/from other third parties (Brand X, Brand Y) via their own proprietary format using an application system as a universal converter. The location information is dynamic and updated periodically by the PCD's communication system via link-up with GPS-based satellites. The Location page indicates the PCD position **801**, indicated by a walking person, as being located on a highway **810**. A waypoint **802** is along the highway en route to the desired destination address **803** located on a local street **804** which intersects the highway. A first point of interest **807** is also displayed as being along the highway, as is a second point of interest **805** along a second local road intersecting the highway. The limited GPS information, providing location, heading and north, is also displayed. The

illustrated Location page display shows only one possible combination of a map layout Other display sequences such as North up, course up, user at top of screen, user in middle, and other display sequences are possible. The dynamic nature of the PCD allows the PCD to display GPS encoded maps as the PCD progresses dynamically with relation to the maps.

Using interpolation techniques, performing spatial query analysis, and establishing layers for best display scale for any given map record allows the device to provide the user extended capability not possessed by traditional GPS devices. Applying various protocols and interpolation techniques allow files to be arranged geographically by distance from a designated point (usually the requesters latitude and longitude as the starting point, but other locations may also be used). The maps are also arranged in layers, menus, limited, listed, showed, displayed, and sorted.

The Location mode provides typical GPS system functions. The touch points MENU **213**, MODE **215** and WAYPOINT **217** and PREFERENCES **221** provide access to the Menu, Mode, Waypoint, and Preferences pages. These pages, along with various buttons on the alphanumeric key pad **26** FIGS. **2** and **4** and special function buttons **27**, are used to configure the display to the user's preference. The preferences page **221** enables selection of such features as voice, maps, scroll, off screen maps away from cursor and other features. The listing name **219** portion of the Location page displays information pertaining to a waypoint selected through the use of the cursor.

FIG. **9** illustrates the Show Me page accessed from the GPS page. The Show Me page shows a list of available maps **901***a–i* stored on-board, which includes maps retrieved from the receive queue area of the PCD memory. The user can load a map into the location or third party pages by pressing the corresponding number key on alphanumeric key pad **26** (shown in FIG. **2**) or by scrolling through the list to highlight the appropriate map and then pressing ENTER button **27***g*. Maps may also be removed from on-board storage using the DELETE button **27***h*.

FIG. **10** illustrates the Get Map page accessed from the GPS Menu page. The user of the PCD can request the map by location from PCD memory or an external source. The user may enter a desired map location. If a map location is entered, the PCD will only search PCD memory for a map for the entered location. Maps from an external source are downloaded via any of the communication links such as the FAX, BEEPER, PHONE or RADIO touchpoints provided in the sub-menu portion of the display **151**. Depending on the user's requirements, several maps could exist showing similar map areas with different layers for viewing. By way of example, airport maps with air space requirements, coastal waterway, maps, and interstate maps, and even hand drawn maps scanned into a computer system all show different resources within a given geographic area. These maps, when presented on the PCD, could over-saturate the display map detail for any given map area. Therefore, it is preferred that the actual map displayed be selectable. Maps are retrieved by pressing QUE IN **550**, scrolling to highlight the desired map, and pressing ENTER **27***g* FIG. **2**.

FIG. **11** illustrates the Third Party page accessed from the GPS menu page. The Third Party page provides an interface to communications with a third party through touch points in the sub-menu display **151**. In the display shown, a user can receive a third party's data and GPS encoded map for viewing on the device or save it for future usage. The user can also dynamically track the third party by periodically having the third party send updates via normal communication links. The third party location can be displayed on maps dynamically sent by map publishers, maps already on-board (furnished at some earlier date), or on maps sent by the third party. The PCD plots and interpolates the GPS data sent by the third party and places an icon **951** (GPS latitude and latitude coordinate pair) on the displayed map using spatial query analysis techniques performed by an application module. The information received from the third party may be other than maps or GPS encoded information, but may be information of any type. The data is received from the third party using phone **400** and radio communication links **500**. A PREFERENCES touch point **274** enables entry of items such as phone numbers for automatic call back and time interval for automatic transmission of information. If the radio, a satellite phone, or other frequency based communications link is utilized, the PREFERENCES touch point allows entry of frequencies for use for automatic transmission of information. A split screen displays the user's location on a map on the left side of display **272** and, after contact with a third party via a communication link, the third party's map and location on the right side of display **273**. If the third party's location is sufficiently close to the user's location, or if the user's displayed map covers a sufficiently large area, both the user's and third party's location can be shown on the same map without resort to a split screen display.

FIG. **32** illustrates a Weather Map Request page. The Weather Map Request page is accessed by pressing the Weather button **27***n* (shown in FIG. **2**) on the PCD. The Weather Map Request page allows the PCD user to specify the map location and scale, the map type, whether the selected map should be automatically updated at specified intervals, and whether a set of maps should be displayed in a sequential fashion. The PCD displays a number of different types of weather maps, including satellite images, radar maps, temperature maps, wind chill maps, and any other type of weather map available. Some weather information is more perfectly provided by showing a sequence of displays indicating the change in weather over time. Therefore, the PCD allows the operator to sequentially display a set of maps, thus providing an animated map display.

FIG. **33** illustrates a weather reporting device. The weather reporting device has a power port **334** to provide electrical power to the weather reporting device. As with the PCD, the weather reporting device may also be powered by a battery (not shown). The weather reporting device also has a computer port **335**, an interface port **333**, an antenna port **332**, a pressure access port **331***a*, and a number of auxiliary ports **331***b–e*. The computer port provides a communications interface to a standard personal computer or the PCD. The interface port provides an interface to systems with weather detection features, such as aircraft with weather radars or lightning strike finders. The antenna port allows an external antenna to be connected to the weather reporting device, thereby providing remote operation capability. The pressure access port provides external access for an internal pressure sensitive device (not shown) for the determination of barometric pressure. A plurality of auxiliary input ports **441***b–e* provide an interface for connecting the weather reporting device to external weather detection sensors such as temperature sensors, wind sensors, and other weather sensing devices.

The Fax page is accessed by pressing the FAX touchpoint on the Main Menu page. FIG. **12** illustrates the Fax page. The sub-menu portion of the display is available for listing previously stored phone numbers. These phone numbers are

selectable as a facsimile destination. In addition, the user can directly enter the phone number to indicate the facsimile destination. As with other pages, the PCD continues to dynamically display the limited GPS information of location, north and heading. The PCD facsimile function is performed by application software executed by the processor. Multiple fax locations, time set, send after certain time, and other traditional functions of fax machines and their implementation are well known in the art. The Fax page provides for display of a message (not shown) entered via the alphanumeric key pad **26** (shown in FIG. **2**) or through selection of messages stored in the send queue area of device memory. Messages stored in the queue area of PCD memory can be selected by scrolling through a directory **305** of all fax messages stored. To view a stored message the user uses the SCROLL button **27***a* (shown in FIG. **2**) to highlight an entry, and then press ENTER button **27***g*. Pressing the SEND button **27***b* transmits the selected or entered facsimile. The user may also view received faxes using this mode by pressing QUE IN **550** FIG. **12**, using the SCROLL button **27***a* to highlight the desired message, and pressing the ENTER button **27***g*.

The Beeper page is accessed from the Main Menu page. Pressing the BEEPER touch point on the Main Menu page causes the processor to display the Beeper page. The device contains capabilities consistent with common practices of beepers, also known as pagers, such as sending and receiving messages. These functions and their implementation are well known in the art The PCD is also satellite communications capable. Beeper messages can be received by the PCD without interference to the other device capabilities. Therefore, the user could continue using the telephone or other features seemingly uninterrupted by the reception of digital beeper messages and display of those messages. The Beeper page provides a list of beeper messages (not shown) stored in the receive queue area. Messages stored in the receive queue can be selected by scrolling through listing **353** FIG. **13** of all beeper messages stored. To view a stored message, the user uses the SCROLL button to highlight a desired message and presses the ENTER button **27***g*. Messages are deleted when the DELETE button is pressed with at least one message selected.

The Phone page is illustrated in FIG. **14**. The Phone page is accessed from the Main Menu page. Pressing the PHONE touchpoint on the Main Menu page causes the processor to display the Phone page. The Phone page is also accessed by pressing the PHONE touchpoint on the Get Map and Third Party pages. As with the other pages, the limited GPS data is continuously displayed showing PCD location, heading, and north. The PCD can access several areas of the display even while the PCD is being used as a telephone. Information provided in the display area **1401** will vary depending upon the page from which the phone page was accessed. The Phone page provides for selection of a function through touch points displayed in the sub-menu portion of the display. The selectable touchpoints are: POLICE **403**, MEDICAL **405**, DATA PROVIDER **407**, DIRECTORY **413**, and MEMORY **415**.

When the POLICE touchpoint is pressed, the PCD places a call to emergency 911. The 911 telephone number is the default, another number could instead have been entered for any particular user through the preferences selection. Once the telephone call is answered, the PCD provides the information entered using the Preferences function and the device location. The user may also establish voice and data communications through the microphone **34** and speaker **33** (shown in FIG. **3**).

The PCD performs equivalent functions when the MEDICAL touchpoint is pressed. As different phone numbers and information can be entered in the selection of user preferences, however, different phone numbers may be used and different information may be transmitted.

When the DATA PROVIDER touchpoint is pressed, the processor displays the Data Provider Connect page. The Data Provider Connect page provides a means to specify the type and amount of data to be downloaded from a specified data provider. The Data Provider Connect page has numerous data fields which are selected by use of the cursor. Once a field is selected, the user may enter data in that field using the alphanumeric keys. The data fields include data for name, city, state, map area, zip code, telephone area code, retail category, distance from device location, and maximum number of listings to be provided by the data supplier. Whether a map only is requested and what particular types of maps, such as interstate maps, walking area maps, zip code maps, street maps, area code maps, or state maps, are requested are also provided as options. Touch points for weather information and traffic reports are also provided. Once the appropriate data fields and/or type of data required is input or selected, pressing the send key transmits the data request to the data provider. Details regarding the method of transmission of the responsive data is automatically sent by the data provider to the data provider along with the data request.

The primary data providers may include the public telephone company networks but may also include other entities. The data providers maintain data, including maps, telephone yellow page entries, and other information such as traffic and weather reports. This information is maintained in a timely manner and is accessible through the use of data base methods well known in those in the art. Upon receiving a request for data, the data provider determines the nature of the data request, searches the appropriate data base or data bases, and transmits the requested information to the requesting device in the manner specified by the requesting device. The user, after the PCD receives the data as requested, disconnects, goes off line to review the information, deleting some, saving others, and storing other encoded information on the PCD. The user can now further edit the device's entire data base and decide a sequence for navigating to the locations listed in the various menus as waypoints. Thus users of the PCD can decide to navigate using the GPS features of the PCD and select certain waypoints and the order in which to proceed. By way of example, but not limited to same, users could select gas stations, banks, restaurants, shopping centers in unfamiliar areas, navigate today from one point of beginning and tomorrow continue navigating from another point of beginning, being assured that the device will always know how to get to various locations. Should the user require further locations to visit, the PCD is capable of obtaining new navigational data and adding to the already active route plan without having to completely start over.

Pressing the DIRECTORY touchpoint **413** displays an alphabetical listing (not shown) of phone numbers stored on-board. The user may scroll through the listing and select a desired phone number. Pressing MEMORY **415**, displays an alphabetical listing (not shown) of frequently used phone numbers. The user may scroll through the listing and select a desired number. Pressing the SEND button causes the device to dial the selected phone number.

FIG. **16** illustrates the Computer page. The Computer page is accessed by pressing the COMPUTER touchpoint **450** (shown in FIG. **6**) on the Main Menu page. The

Computer page allows the user to operate the device as a standard personal computer utilizing application programs of the type normally present on personal computers. As examples, the display of FIG. **16** provides for touchpoints in the sub-menu portion of the display for calendar date entry, notes, and organizer application programs. As with the other pages, the limited GPS information is also displayed.

FIG. **17** illustrates the Radio page. The Radio page is accessed by pressing the RADIO touchpoint **500** on the Main Menu page. The radio mode provides the user with an interface for selecting the type of radio signal through touch points displayed in the sub-menu **151** area. The selectable types are: AM **503**, FM **507** and TRANSCEIVER **511**. Selecting any type will display a page (not shown) requesting frequency, volume, and other parameters relating to radio transmission and reception. The AM and FM are standard receivers. The device can thereby tune and listen to broadcasts that provide data links and receive data files using legal AM or FM radio bands (or any other radio band legal to access and provide radio station information). The device therefore allows users to communicate information amongst themselves without having to rely on telephone technology. This is especially valuable when telephone technology is not available.

The Receive Queue page displays stored received messages. The received messages may be displayed by reception type through selection of the transmission line type listed in the sub-menu portion of the display, the selectable types, through touch points displayed in the sub-menu **151** area, are: ALL **553**, FAX **555**, BEEPER **557**, PHONE **559**, COMPUTER **561** and RADIO **563**. Selecting a type, will sort (by specified type) and display (by date and time) all messages received. By way of example, the radio queue contains GPS-encoded voice mail or digital files (containing information to various sites) provided by private third-party sources. The phone system queue contains previous calls with digital messages linked to web pages containing voice and video data. The computer which may be queued contains personal letters, calendars, notes and the like from more traditional sources or user created tagged files for storage. The fax queue contains traditional faxes which may illustrate maps with waypoints. The beeper mode queue contains received beeper messages (digital and voice).

The Send Queue page is accessed by pressing the SEND QUE touchpoint on the Main Menu page. The Send Queue page includes similar functions as the receive queue, except the Send Queue is a staging area for sending messages. The Send Queue page displays sent or to-be-sent data and an interface for selecting the specific type of queue. The selectable types, through touch points displayed in the sub-menu portion of the display **151**, are: ALL **603**, FAX **605**, BEEPER **607**, PHONE **609**, COMPUTER **611** and RADIO **613**. Selecting a type, will sort (by specified type) and display (by date and time) all messages sent or waiting to be sent.

FIGS. **23**A and B are a system block diagram including a block diagram of a data provider. A plurality of PCDs **231**, **232**, **233** communicate with each other using the aforementioned communication means. The PCDs also communicate with various data base information suppliers including private data base information suppliers, publisher data base information suppliers, telephone service data base information suppliers, and a data base provider. The data base provider receives digital requests for map information or other data regarding a geographic area. The data provider collects map data and other data and tags the other data to the map data and maintains the map and location tagged data in a data base. Human intervention is not required in responding to data requests.

As shown in FIG. **23**B, the application module of the device is ported to a computer system not GPS capable, or merely not portable so as to have no need for a GPS receiver. The application module allows non-PCD based computer users to provide data to the data provider in the correct format, as well as receive data from devices or the data provider. This allows the non-device base computer user to track the location of devices and to collect information to be manually entered into a traditional GPS capable device as an aid in future trip planning.

FIG. **20** illustrates a list of GPS encoded data for a restaurant listing of restaurants in a requested area. This list may have been furnished by third parties or a data provider. The PCD has stored this information in digital format and is displayed on a GEO coded map, GIFF map or any other map the PCD stored in memory or receives from a third party or data provider. The information can be arranged by the PCD using criteria enabling the user unlimited access to the data. If the user chooses to navigate to these locations singularly or as a group, the GPS engine performs these functions, allowing a user of the device to accurately travel to the desired restaurant. As shown in FIG. **21**, the PCD can use any scale of map or combinations and other types of maps as shown. The user of the PCD selects certain maps for storage and recalls same when needed for navigation. By way of example, the user's device could have a local Los Angeles street map, an interstate map (as shown in FIG. **21**), and a New York city map in device memory. The user could navigate to the airport using the GPS functions and stored Los Angeles map, fly to New Jersey, rent a car and navigate to New York using the interstate map and, finally, find a specific restaurant in New York City by using the third map stored in PCD memory.

As shown in FIG. **22**, the PCD contains a map with various waypoint locations the user has selected. These waypoints are both standard waypoints **221** and linked waypoints **222**. The waypoints are indicated by a marker on the display. Standard waypoints indicate identifiable locations of interest. Linked waypoints have additional data associated with the waypoint. The additional data may be text data, visual data such as a photographic image of the waypoint, or an audio data file. When the marker for the linked waypoint is selected using the touch screen or other input device, the processor determines if the additional data associated with the waypoint is available in the PCD memory. If the additional data is not available in the PCD memory, the PCD automatically requests the additional data from a data provider. Once the additional data is available, the PCD displays or otherwise makes use of the additional data.

Using the map of FIG. **22**, the user could navigate to a school, restaurant, bank, gas station, government office using the PCD to interpolate using spatial query techniques to find the best routes to each location. The PCD can re-collate the list for the most efficient route using the application and GPS engine modules. Using software programming techniques and math formulas, persons skilled in the arts will utilize spatial analysis queries and functions to determine best routing and "closest to" scenarios. In addition, centroid interpolation functions and match-rate comparison functions used by the GEO coding community will further enhance this application's ability to universally communicate with other systems.

FIG. **30** further illustrates a system whereby the user uses a PCD to dial a direct access number similar to dialing 411,

but all requests are requested and serviced automatically. Upon connection to the system, the user makes keyboard requests to the PCD or traditional computer system using the application program of the PCD. Upon requests being received by the data provider or similar information provider, the provider or supplier searches the data base for data responsive to the request. The provider or supplier can access further data through data links to other third party sources and continue to provide all data required by the requester. This system is consistent with the world wide web, linking data through hypertext connections and designations. This invention's system converts information requests to data requests, not verbal requests, as presently being practiced in directory assistance type services. This narrow usage of the application module allows convenient access to directory assistance that primarily provides data and chunks of information in a short period of time consistent with directory assistance today.

FIG. **31** shows a web page screen with a data provider icon displayed on the device. Pressing or otherwise selecting the icon will enable a menu for the requester to specify a data request. Download will be in the form of a compressed digital data file that may include video, sound, or other digitally encoded data.

While this invention has been described with reference to illustrative embodiments, this description is not intended to be construed in any limiting sense. Various other embodiments of the invention will be apparent to persons skilled in the art upon reference to this description. It is therefore contemplated that the appended claims will cover any such modifications of the embodiments as fall within the true scope and spirit of the invention.

What is claimed is:

1. A method of providing geographical related data comprising:

determining a location of a device with a display;

requesting map information and additional data associated with specific locations within the map information from an external location using a wireless communication capability;

receiving the map information and additional data associated with specific locations within the map information from the external location using the wireless communication capability;

storing the map information and additional data associated with the specific locations within the map information;

displaying the map information, markers at specific locations within the map information, the markers indicating availability of additional data associated with the specific locations within the map information, and the location of the device with respect to the map information;

receiving a selection of one of the markers;

determining if additional information associated with a specific location identified by the selected marker is stored on the device; and

requesting further additional data associated with the specific location from the external location using the wireless communication capability if the additional information is not stored on the device.

2. The method of claim **1** further comprising receiving GPS signals.

3. The method of claim **2** wherein determining a location of a device with a display comprises processing the GPS signals.

4. The method of claim **1** where in

storing the map information and additional data associated with the specific locations within the map information comprises storing the map information and additional data associated with the specific locations within the map information in memory of the device with a display.

5. The method of claim **1** wherein displaying the map information, the markers, and the location of the device with respect to the map information comprises displaying the map information, the markers, and the location of the device with respect to the map information on the display of the device with a display.

6. The method of claim of claim **1** wherein the additional data comprises a video data file.

7. The method of claim **1** wherein the additional data comprises an audio data file.

8. The method of claim **1** wherein the map information pertains to the location of the device with a display.

9. The method of claim **1** wherein requesting map information and additional data associated with specific locations within the map information from an external location using a wireless communication capability comprises requesting map information and additional data associated with specific locations within the map information from the external location over a cellular phone network.

10. The method of claim **1** wherein determining a location of a device with a display comprises determining a location of a device periodically.

* * * * *

EXHIBIT C

US007343165B2

(12) **United States Patent**
Obradovich

(10) **Patent No.: US 7,343,165 B2**
(45) **Date of Patent: Mar. 11, 2008**

(54) **GPS PUBLICATION APPLICATION SERVER**

(75) Inventor: **Michael L. Obradovich**, San Clemente, CA (US)

(73) Assignee: **American Calcar Inc.**, Las Vegas, NV (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 597 days.

(21) Appl. No.: **09/833,969**

(22) Filed: **Apr. 11, 2001**

(65) **Prior Publication Data**

US 2002/0045456 A1 Apr. 18, 2002

Related U.S. Application Data

(60) Provisional application No. 60/196,575, filed on Apr. 11, 2000.

(51) **Int. Cl.**
H04Q 7/20 (2006.01)

(52) **U.S. Cl.** **455/456.1**; 455/461

(58) **Field of Classification Search** .. 455/456.1–456.6, 455/461, 457; 342/357.01, 357.09
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,350,970	A	9/1982	von Tomkewitsch
4,521,857	A	6/1985	Reynolds, III
4,792,803	A	12/1988	Madnick et al.
4,812,843	A	3/1989	Champion, III et al.
4,977,509	A	12/1990	Pitchford et al.
5,043,736	A	8/1991	Darnell et al.
5,119,504	A	6/1992	Durboraw, III
5,124,915	A	6/1992	Krenzel
5,164,904	A	11/1992	Sumner
5,189,632	A	2/1993	Paajanen et al.
5,225,843	A	7/1993	Thompson
5,235,633	A	8/1993	Dennison et al.
5,265,024	A	11/1993	Crabill et al.
5,267,042	A	11/1993	Tsuchiya et al.
5,295,064	A	3/1994	Malec et al.
5,299,132	A	3/1994	Wortham
5,334,974	A	8/1994	Simms et al.
5,335,276	A	8/1994	Thompson et al.

(Continued)

FOREIGN PATENT DOCUMENTS

EP	0713317	5/1996

(Continued)

OTHER PUBLICATIONS

Written Opinion for International Application PCT/US01/12066, filed Apr. 11, 2001, Mailed Apr. 10, 2002 (4 pgs).

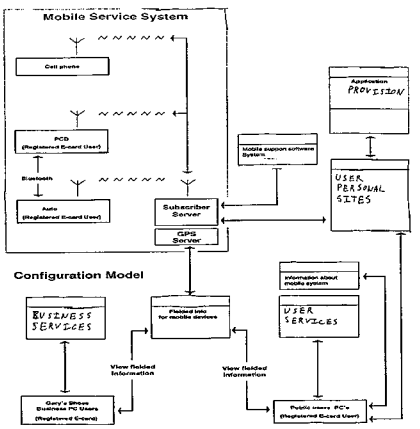
(Continued)

Primary Examiner—Lee Nguyen
(74) *Attorney, Agent, or Firm*—Christie, Parker & Hale, LLP

(57) **ABSTRACT**

A GPS publication application server. A mobile location knowledgeable device is in communication with a server. The server provides indications of the device's location to a home page associated with the device. The home page includes information about a user of the device and methods of contacting the user at any particular time. The server is also in communication with a variety of application servers. The application servers push information to the device depending on the device location and preferences listed in the home page of the device.

12 Claims, 6 Drawing Sheets



U.S. PATENT DOCUMENTS

5,420,592	A	5/1995	Johnson	
5,432,841	A	7/1995	Rimer	379/59
5,450,329	A	9/1995	Tanner	
5,479,351	A	12/1995	Woo et al.	
5,479,482	A	12/1995	Grimes	
5,497,339	A	3/1996	Bernard	
5,517,193	A	5/1996	Allison et al.	
5,519,403	A	5/1996	Bickley et al.	
5,528,248	A	6/1996	Steiner	
5,555,286	A	9/1996	Tendler	
5,559,520	A	9/1996	Barzegar et al.	
5,559,707	A	9/1996	DeLorme et al.	
5,572,204	A	11/1996	Timm et al.	
5,579,535	A	11/1996	Orlen et al.	
5,625,668	A	4/1997	Loomis et al.	
5,625,884	A	4/1997	Gitlin et al.	
5,627,549	A	5/1997	Park	
5,630,068	A	5/1997	Vela et al.	
5,636,269	A	6/1997	Eisdorfer	
5,642,285	A	6/1997	Woo et al.	
5,647,002	A	7/1997	Brunson	
5,648,763	A	7/1997	Long	
5,648,769	A	7/1997	Sato et al.	
5,654,886	A	8/1997	Zereski, Jr. et al.	
5,661,652	A	8/1997	Sprague et al.	
5,663,548	A	9/1997	Hayashi et al.	
5,673,039	A	9/1997	Pietzsch et al.	
5,677,837	A	10/1997	Reynolds	
5,680,444	A	10/1997	Reeves	
5,694,514	A	12/1997	Evans et al.	
5,699,056	A	12/1997	Yoshida	
5,712,625	A	1/1998	Murphy	
5,717,748	A	2/1998	Sneed, Jr. et al.	
5,717,749	A	2/1998	Sneed, Jr. et al.	
5,719,936	A	2/1998	Hillenmayer	
5,720,037	A	2/1998	Biliris et al.	
5,724,417	A	3/1998	Bartholomew et al.	
5,727,053	A	3/1998	Sizer, II et al.	
5,731,997	A	3/1998	Manson et al.	
5,742,509	A	4/1998	Goldberg et al.	
5,748,252	A	5/1998	Draves	
5,760,742	A	6/1998	Branch et al.	
5,774,070	A	6/1998	Rendon	
5,774,825	A	6/1998	Reynolds	
5,774,827	A	6/1998	Smith, Jr. et al.	
5,781,150	A	7/1998	Norris	
5,786,789	A	7/1998	Janky	
5,790,974	A	8/1998	Tognazzini	
5,794,174	A	8/1998	Janky et al.	
5,802,492	A	9/1998	DeLorme et al.	
5,819,227	A	10/1998	Obuchi	
5,848,373	A	12/1998	DeLorme et al.	
5,864,305	A	1/1999	Rosenquist	
5,908,464	A	6/1999	Kishigami et al.	
5,919,246	A	7/1999	Waizmann et al.	
5,929,774	A	7/1999	Charlton	
5,938,721	A	8/1999	Dussell et al.	
5,946,626	A	8/1999	Foladare et al.	455/456
5,948,040	A	9/1999	DeLorme et al.	
5,963,956	A	10/1999	Smartt	
5,982,298	A	11/1999	Lappenbusch et al.	
5,999,124	A	12/1999	Sheynblat	
5,999,877	A	12/1999	Takahashi et al.	
6,028,550	A	2/2000	Froeberg et al.	
6,047,327	A	4/2000	Tso et al.	
6,075,874	A	6/2000	Higashikubo et al.	
6,087,965	A	7/2000	Murphy	
6,092,076	A	7/2000	McDonough et al.	
6,107,939	A	8/2000	Sorden	
6,107,944	A	8/2000	Behr et al.	
6,119,066	A	9/2000	Sugiura et al.	
6,122,506	A	9/2000	Lau et al.	
6,124,825	A	9/2000	Eschenbach	
6,127,945	A	10/2000	Mura-Smith	
6,131,066	A	10/2000	Ahrens et al.	
6,134,501	A	10/2000	Oumi	
6,141,610	A	10/2000	Rothert et al.	
6,144,920	A	11/2000	Mikame	
6,147,598	A	11/2000	Murphy et al.	
6,148,261	A	11/2000	Obradovich et al.	
6,163,749	A	12/2000	McDonough et al.	
6,163,753	A	12/2000	Beckmann et al.	
6,166,626	A	12/2000	Janky et al.	
6,169,955	B1	1/2001	Fultz	
6,173,231	B1	1/2001	Chojnacki	
6,184,801	B1	2/2001	Janky	
6,185,427	B1	2/2001	Krasner et al.	
6,188,957	B1	2/2001	Bechtolsheim et al.	
6,192,312	B1	2/2001	Hummelsheim	
6,192,314	B1	2/2001	Khavakh et al.	
6,199,013	B1	3/2001	O'Shea	
6,202,023	B1	3/2001	Hancock et al.	
6,208,934	B1	3/2001	Bechtolsheim et al.	
6,212,392	B1	4/2001	Fitch et al.	
6,212,470	B1	4/2001	Seymour et al.	
6,212,472	B1	4/2001	Nonaka et al.	
6,212,473	B1	4/2001	Stefan et al.	
6,212,550	B1	4/2001	Segur	
6,215,857	B1	4/2001	Kasiviswanathan	
6,215,993	B1	4/2001	Ulveland	
6,219,557	B1	4/2001	Havinis	
6,219,614	B1	4/2001	Uchihaki et al.	
6,219,694	B1	4/2001	Lazaridis et al.	
6,321,158	B1	11/2001	DeLorme et al.	
6,332,127	B1	12/2001	Bandera et al.	
6,360,102	B1 *	3/2002	Havinis et al.	455/457
6,377,810	B1 *	4/2002	Geiger et al.	455/456.2
2002/0068551	A1 *	6/2002	Strunk et al.	455/414

FOREIGN PATENT DOCUMENTS

EP	0 829 704 A2	3/1998
EP	0853287 A2	7/1998
JP	9-231263	9/1997
JP	113072	1/1999
WO	WO 99/56144	11/1999
WO	WO 00/03364	1/2000
WO	WO 00/04730	1/2000

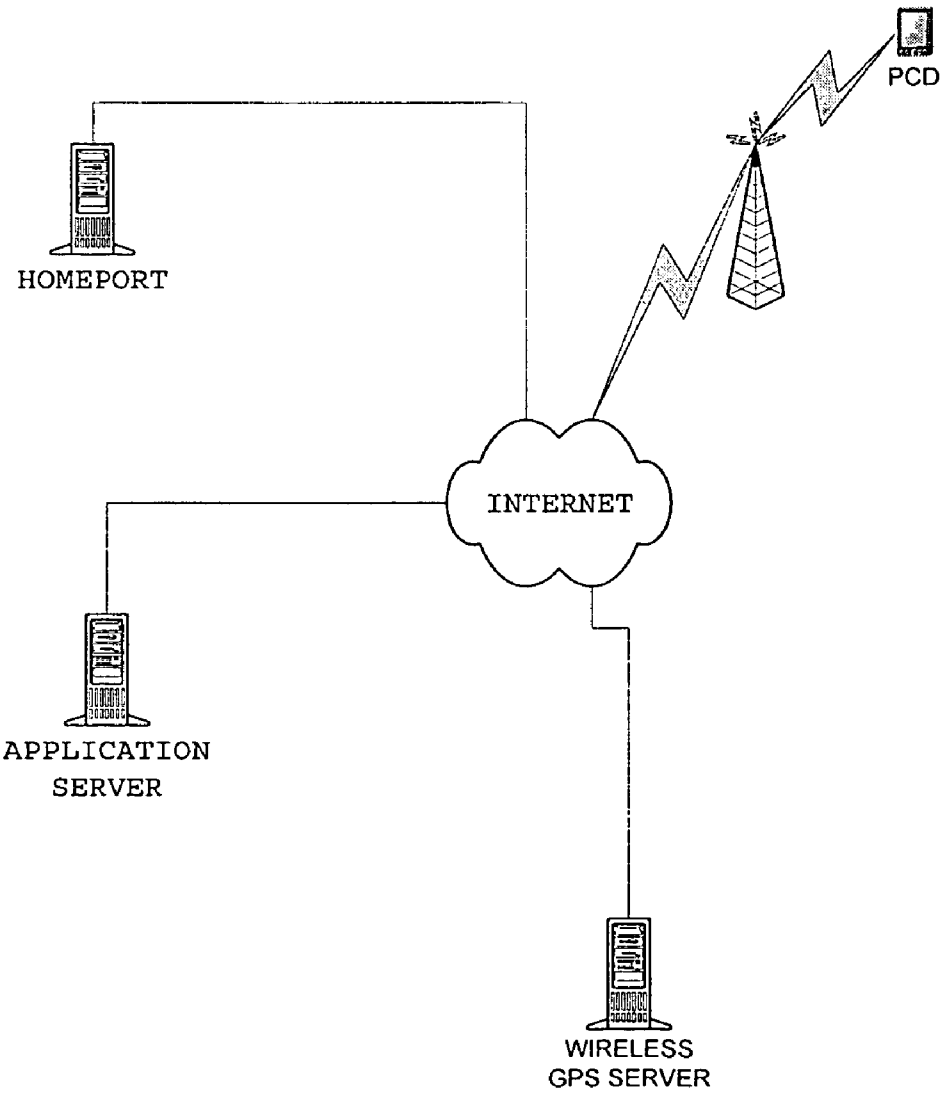
OTHER PUBLICATIONS

International Search Report of PCT/US01/12066 mailed Aug. 8, 2001 (4 pages).
Supplementary European Search Report for European Application Publication No. 1279305, published Jan. 29, 2003, Search Report Dated Mar. 21, 2003 (3 pages).
Alcatel web pages, Alcatel, Nov. 24, 1998 (58 pages).
Giga Information Group, Inc. web pages, Giga Information Group, Inc. Nov. 24, 1998 (4 pages).
Spyglass web pages, Spyglass, Nov. 24, 1998 (58 pages).
Think Thin, PC Magazine, Dec. 1, 1998 (p. 9).
McDonald, Keith D., "Course 122—GPS Fundamentals & Applications", Navtech Seminars & GPS Supply, Inc., Catamaran Resort Hotel, San Diego, CA, Mar. 22-23, 1999 (336 sheets).
Kelley, Tom, "Traffic Control Traffic Data, Unplugged", ITS World, Jul./Aug. 2000 (pp. 28-30).
Bishop, Richard, "The Final Stop Remember IVHS?", ITS World Jul./Aug. 2000 (pp. 14-15).
Metricom in the News, web pages, Metricom, Inc., Nov. 24, 1998 (8 pages).
Demmler, "Another car navigation system," Automotive Engineering, Jun. 1996, pp. 87,89, 2 pages.
Jewett, "Toyota offers navigation system as U.S. option," Automotive News, Nov. 18, 1996, p. 16, 2 pages.

Yamaguchi, "Honda in-car navigation system for the U.S.," Automotive Engineering, Jun. 1996, pp. 82-84, 3 pages.
Heuchert, "Eyes Forward: An ergonomic solution to driver information overload," Automotive Engineering, Sep. 1996, pp. 27-31, 5 pages.
Noriyuki, "Just Think of It as a Big Eye in the Sky . . . Watching," Los Angeles Times Section E, pp. 1, 8, Apr. 27, 1997, 3 pages.
"Trimble Demonstrates Trimconnect," Flying, Jul. 1997, p. 51, 1 page.
Steve Dye with Dr. Frank Baylin, The GPS Manual Principles and Applications, "Land Navigation Markets—Overview", Feb. 1997, ISBN:0-917893-29-8, 23 pages.

* cited by examiner

FIG. 1


PCD
HOMEPORT
INTERNET
APPLICATION SERVER
WIRELESS GPS SERVER

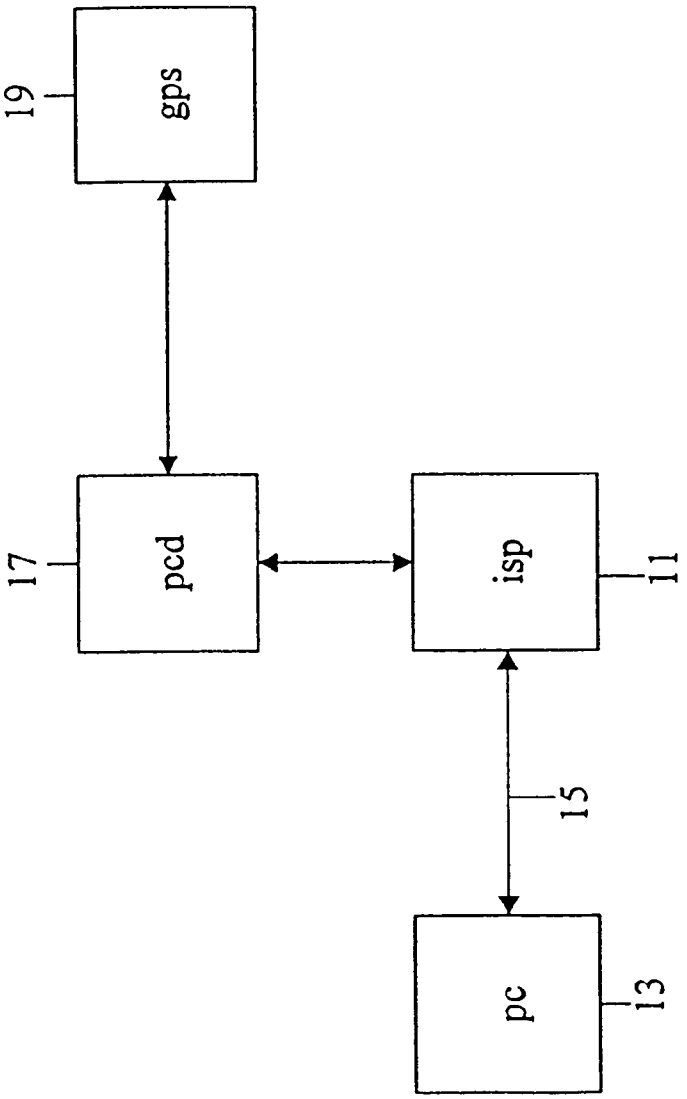
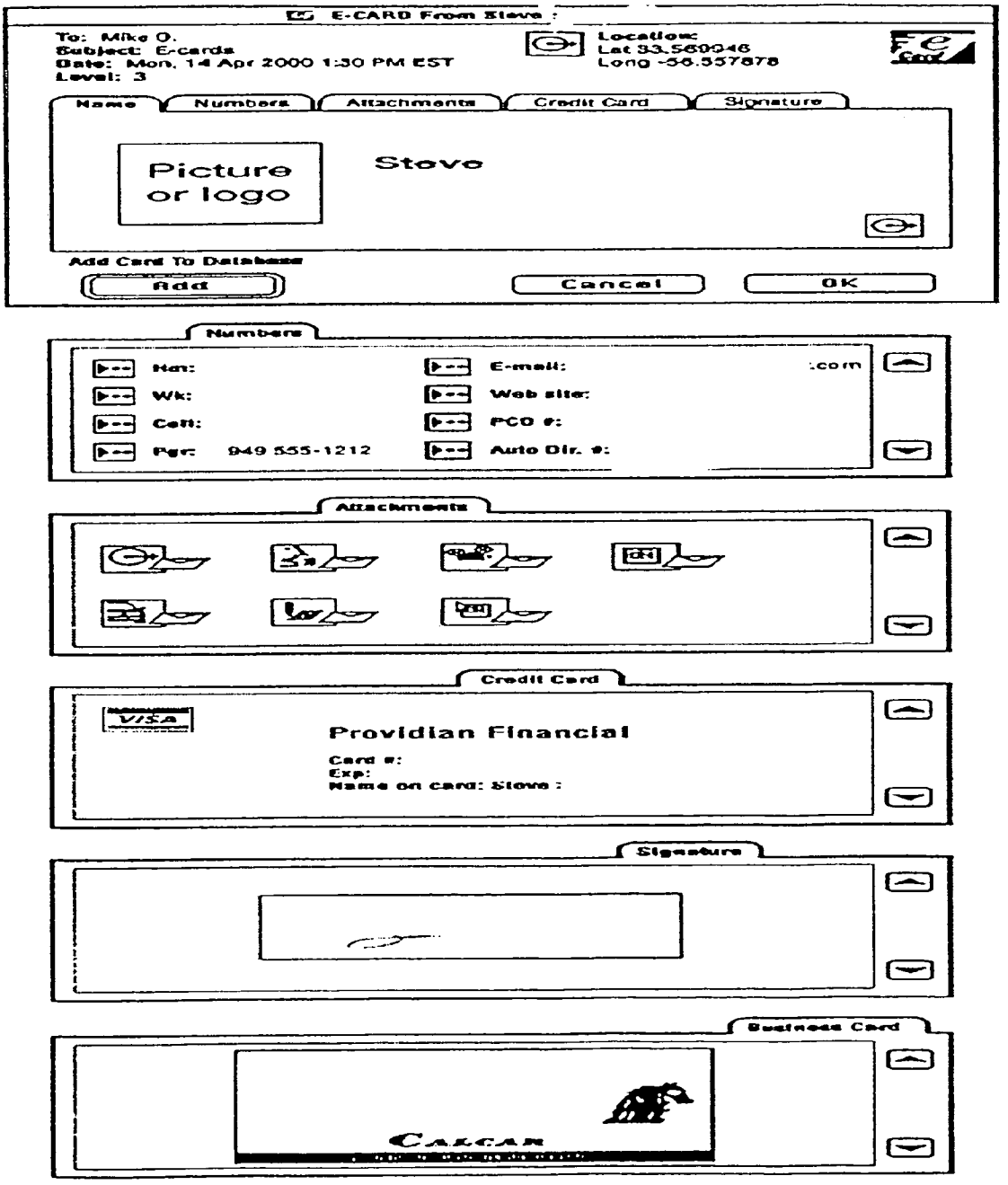


FIGURE 1A

FIG. 2


E-CARD From Steve :
To: Mike O.
Subject: E-cards
Date: Mon, 14 Apr 2000 1:30 PM EST
Level: 3
Location:
Lat 33.560946
Long -56.557878
Name
Numbers
Attachments
Credit Card
Signature
Picture or logo
Steve
Add Card To Database
Add
Cancel
OK
Numbers
Hm:
Wk:
Cell:
Pgr: 949 555-1212
E-mail:
Web site:
PCO #:
Auto Dir. #:
.com
Attachments
Credit Card
VISA
Providian Financial
Card #:
Exp:
Name on card: Steve :
Signature
Business Card
CALGAR

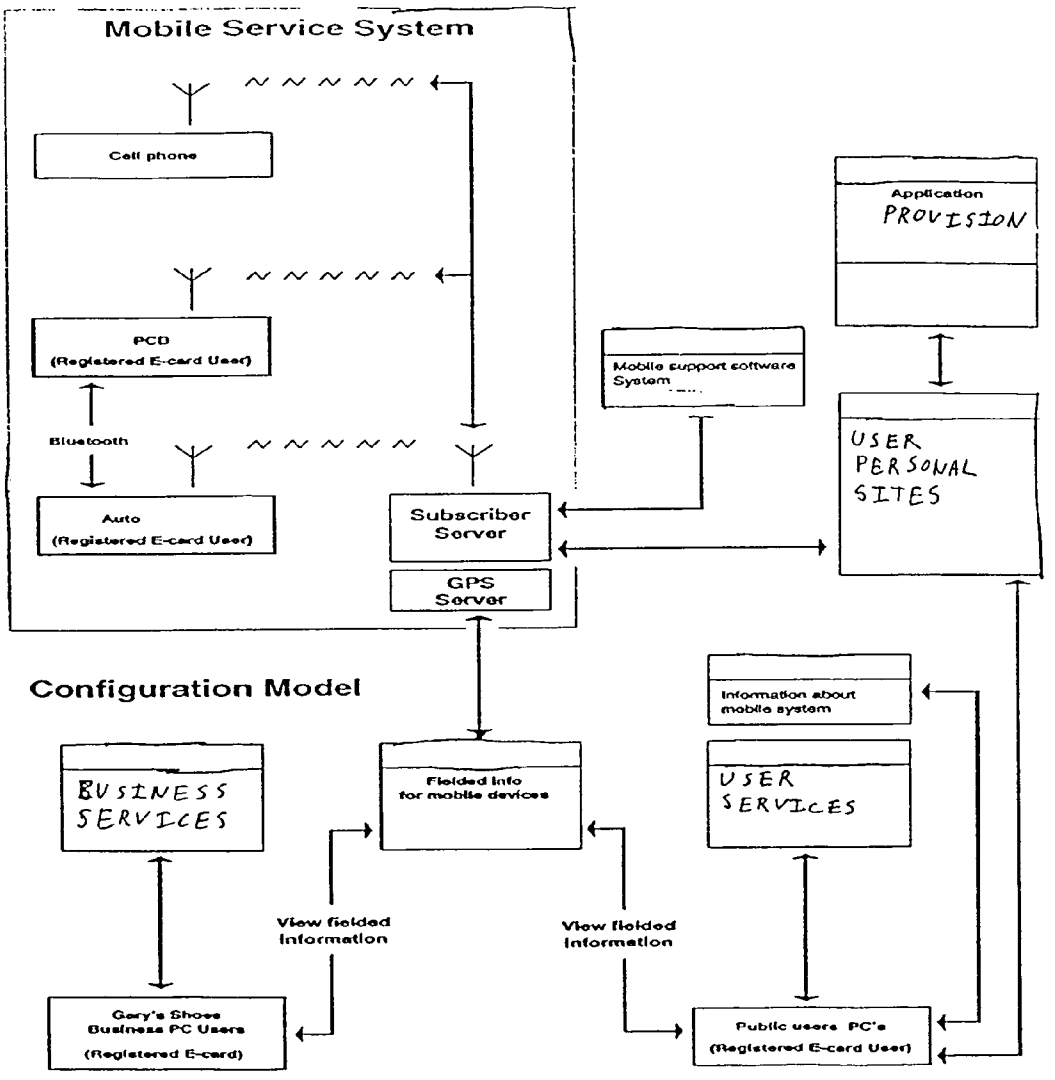

Mobile Service System
Cell phone
PCD
(Registered E-card User)
Bluetooth
Auto
(Registered E-card User)
Subscriber Server
GPS Server
Application
PROVISION
Mobile support software System
USER PERSONAL SITES
Configuration Model
Information about mobile system
BUSINESS SERVICES
Fielded info for mobile devices
USER SERVICES
View fielded information
View fielded information
Gary's Shoes Business PC Users
(Registered E-card)
Public users PC's
(Registered E-card User)

FIG 3

FIG 4

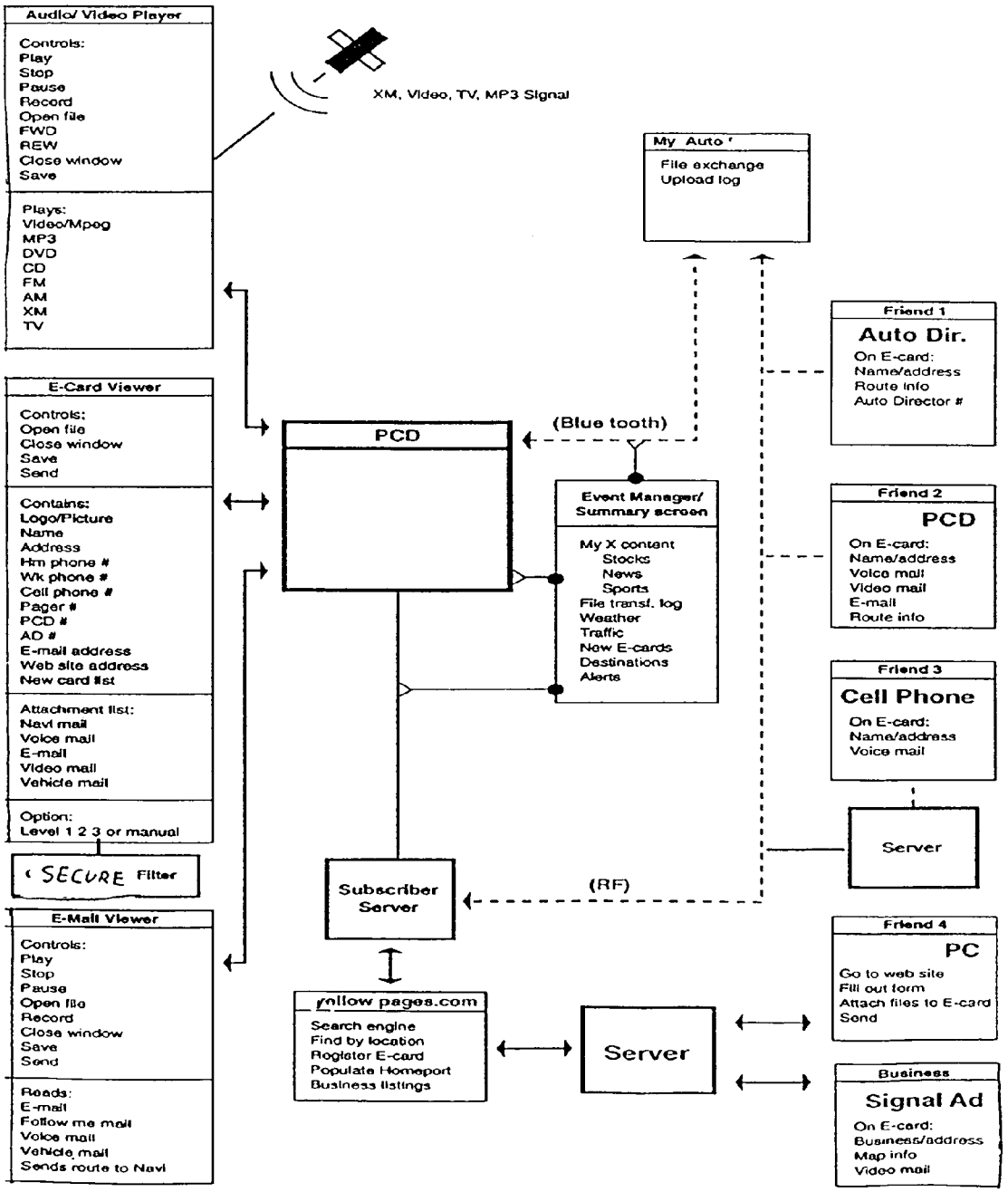
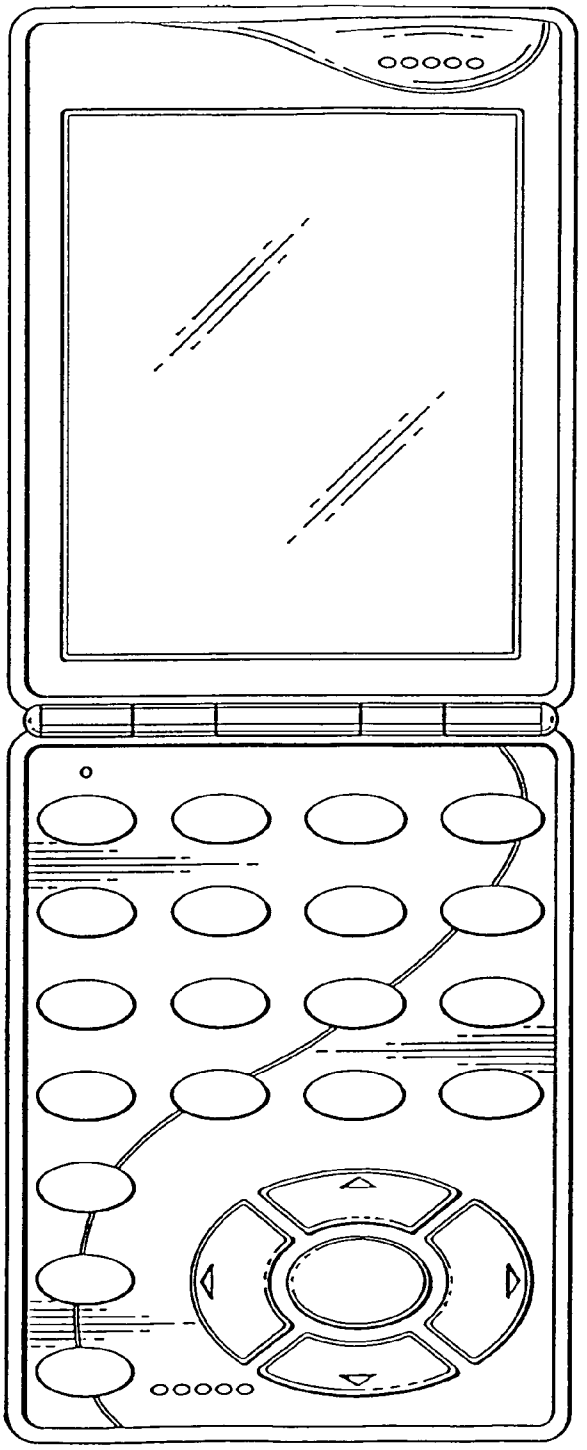

Audio/ Video Player
Controls:
Play
Stop
Pause
Record
Open file
FWD
REW
Close window
Save
Plays:
Video/Mpeg
MP3
DVD
CD
FM
AM
XM
TV
XM, Video, TV, MP3 Signal
My Auto '
File exchange
Upload log
Friend 1
Auto Dir.
On E-card:
Name/address
Route info
Auto Director #
E-Card Viewer
Controls:
Open file
Close window
Save
Send
Contains:
Logo/Picture
Name
Address
Hm phone #
Wk phone #
Cell phone #
Pager #
PCD #
AD #
E-mail address
Web site address
New card list
Attachment list:
Navi mail
Voice mail
E-mail
Video mail
Vehicle mail
Option:
Level 1 2 3 or manual
SECURE Filter
PCD
(Blue tooth)
Event Manager/
Summary screen
My X content
Stocks
News
Sports
File transf. log
Weather
Traffic
New E-cards
Destinations
Alerts
Friend 2
PCD
On E-card:
Name/address
Voice mail
Video mail
E-mail
Route info
Friend 3
Cell Phone
On E-card:
Name/address
Voice mail
Server
Subscriber
Server
(RF)
E-Mail Viewer
Controls:
Play
Stop
Pause
Open file
Record
Close window
Save
Send
Reads:
E-mail
Follow me mail
Voice mail
Vehicle mail
Sends route to Navi
Follow pages.com
Search engine
Find by location
Register E-card
Populate Homeport
Business listings
Server
Friend 4
PC
Go to web site
Fill out form
Attach files to E-card
Send
Business
Signal Ad
On E-card:
Business/address
Map info
Video mail

FIG. 5



GPS PUBLICATION APPLICATION SERVER

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit of the filing date of U.S. Provisional Patent Application No. 60/196,575, filed Apr. 11, 2000, the disclosure of which is incorporated by reference.

BACKGROUND

The present invention relates generally to user mobile information systems, and more specifically to location identifiable user mobile communication systems.

The use of mobile communication units, such as cellular telephones, is becoming increasingly common. Cellular telephones, for example, allow individuals to communicate with others when those individuals are away from a base of operations, on the go, or at locations having insufficient or inconvenient land telephone lines. In addition, communication systems such as cellular telephones provide a simple and easy way to communicate with individuals carrying cellular telephones no matter where they are, so long as one knows the appropriate telephone number.

At times, however, knowledge of the location of an individual is important. For example, some communication methods, such as facsimile, generally are not mobile in nature. For example, often to send a facsimile one needs to know the location and number of a fixed fax machine to which a fax may be sent. Similarly, it is often difficult to courier packages to a person whose location is not known.

However, in many instances it is not feasible to contact an individual, even one who has a cellular telephone, and ask the individual their location. The individual may not know their location or other particular details such as street address or facsimile number necessary to send the individual items. Moreover, some individuals may jealously guard the number of their cellular telephone, so that in many instances it is not possible to simply call a person on their cellular telephone to determine their location. Further, in some instances people are unable to answer their cellular telephone to provide their location information to those who know their telephone number.

Thus, the use of cellular telephones and generally mobile communication systems, provides for the increased transmission of information between individuals, particularly those on the move. However, the communication of information, particularly other than a voice information, is not fully utilized using such communication systems.

In addition, individuals on the move often have unique information requirements, particularly with respect to information concerning places near their location. Such needs are also not fully met by mobile communication systems, even though such information is generally available on communication networks. For example, server computers reachable through the internet are commonly provide nearly boundless information, with much of the information having geographical relevance. Such information is often largely unavailable to users of mobile communication systems, and moreover is not particularly adapted to suit the needs of users of mobile communication systems.

SUMMARY OF THE INVENTION

In one embodiment of the present invention a GPS server periodically requests information from a mobile device. The mobile device includes GPS receiver circuitry to receive GPS signals. The GPS receiver makes use of information provided by a GPS reference server and error correction processing performed by the GPS reference server to determine its location. Upon probing by the GPS server the mobile device provides the GPS server the present position of the mobile device, as well as additional information.

Techniques for communicating GPS related information to wireless devices, particularly information allowing a wireless communication device to quickly obtain its location are known. In the present invention, certain user preferences are communicated to Internet coupled computer devices.

In this new system and method certain preferences are sent from a wireless device to a GPS server and then forwarded on to a separate application server for storing in the users personal home page location, or user-specific storage space allows the user to populate their own database and communicate certain information from that database to other users that were enabled to receive the populated information.

Work groups, community groups and other would be a recipient of this populated database system, thereby allowing dynamic data exchange between preidentified parties. Moreover, different users may have different specific applications that take advantage of this population technique.

Examples include advertising information provided to a user's device once the user's travel pattern is established and personal preferences are considered. Call ID system could be updated and other users would be able to communicate with the user upon receipt of their requests. Using this system the user may simply send visited locations as determined by the GPS server to the users home page for storage and for populating a user's database. Acting on timely requests the GPS server modifies the user's preferences upon probing the user for the GPS data and contact information.

At any time the user could contact the home page for review of stored information and to modify the status of users who subscribe to the user's home page.

This new publishing and subscribing system puts increases storage and calculation tasks on an application server to sort out and serve up to the user upon a request. The PCD device uses less battery power and is not required to perform task beyond its normal operations and changing the user's preferences for the publishing system. The user may request a complete review of their dynamic data upon contacting their own home page. Caller ID systems thereafter route the request for contact to the user's home page and then be given choices for going forward. The user can deny any party access upon sending data along with the GPS probe made by the GPS server. This system does not require the user to make further contact when changing their preferences.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1A** is a block diagram of a system in accordance with aspects of the present invention.

FIG. **1** is a further block diagram of a system in accordance with aspects of the present invention.

FIG. **2** illustrates an e-card in accordance with aspects of the present invention.

FIG. **3** illustrates a block diagram of interconnections in accordance with the present invention.

FIG. **4** is a further block diagram of interconnections in accordance with aspects of the present invention.

FIG. **5** illustrates a PCD.

DETAILED DESCRIPTION

FIG. **1**A illustrates a block diagram of a system in accordance with aspects of the present invention. An Internet service provider (ISP) **11** is linked to a user personal computer **13** via telephone lines **15**. In actuality, one or more computer units may be interdisposed between the PC and the server, with the server being a node on the Internet. The server is also connected via communication link to a personal computer device **17**. One embodiment of the personal computer device is illustrated in FIG. **5** The personal computer device may be a PCD of the type disclosed in U.S. patent application Ser. No. 08/879,955, now U.S. Pat. No. 6,148,261, the disclosure of which is incorporated herein in its entirety by reference.

The PCD includes a global positioning system (GPS) receiver. Accordingly, the PCD receives signals from GPS satellites **19**. The received signals allow the PCD to determine its latitude and longitude.

The PC, in one embodiment serves as a server. The server includes a database. The database includes information pertaining to a variety of topics. More specifically, in one embodiment the database includes information relating to locations. That is, the database includes information regarding specific locations, as well as information pertaining to transportation to and from these locations.

The information in the database is provided by businesses, individuals, and users of PCDs. Thus, the database contains general information provided by businesses, stores, and other commercial entities who wish to make information concerning their business available to others. The database also contains personalized information regarding points of interest and other matters provided by users of PCDs. The database therefore provides a source of information to the users of PCDs, particularly information regarding geographic locations.

FIG. **1** illustrates a further system of the present invention. A personal communication device (PCD) **11** provides GPS receiver and wireless communication capability, particularly cellular telephone communication capability. The PCD may, in one embodiment, be such as disclosed in the aforementioned U.S. patent application Ser. No. 08/879,955, now U.S. Pat. No. 6,148,261. The PCD receives information from a wireless GPS server **13** via cellular telephone communication link. The PCD also provides the wireless GPS server information over the communication link, including information relating to the location of the PCD. In one embodiment the PCD determines its location using, for example, its GPS capability. In another embodiment the PCD contains only a limited amount of GPS receiver processing circuitry. Instead, some of the GPS processing occurs at a wireless GPS server. The wireless GPS server performs, for example, functions such as determining satellites in view of the PCD and the relative Doppler offsets of the satellites. This may be accomplished, for example, using apparatus and methods discussed in U.S. Pat. No. 5,663,734 entitled "GPS Receiver and Method for Processing GPS Signals," the disclosure of which is incorporated by reference. In one embodiment, error correction processing is also performed by the wireless GPS server, thereby further allowing reduced single processing on the part of the PCD.

Accordingly, in one embodiment the PCD provides a wireless GPS server with the present location and an identifying tag indicating the identity of the PCD. The GPS server provides the PCD location and identifier to an application server **15**. The application server is provided the information from the GPS server via the Internet, or in some cases an intranet. The application server upon receipt of the PCD location and identifying tag executes a program which updates a user-specific data space **17**. In one embodiment, the user-specific space is located on the same computer unit as the application server. In other embodiments, the user-specific data space is stored in a separate computer system.

In one application the application server and the wireless GPS server communicate using a hypertext transfer protocol (HTTP) and the wireless GPS server requests that application server execute a CGI script or program making use of the PCD identifier and the PCD location data.

Thereafter the user contacts the application server to obtain information stored in the user-specific storage area. In addition, other individuals may also contact the application server request of the location of the PCD device. This may be accomplished for example, in order to determine how to contact the individual using the PCD.

In one embodiment the user-specific storage space includes information found on an electronic card (e-card). An example of information stored in the e-card is illustrated in FIG. **2**. As illustrated in FIG. **2**, the e-card includes a name, an address such as may be found on physical business cards. The e-card also includes communication information, such as phone numbers for home, work, cell, pager, and PCD, and automobile. Further, the numbers include a web site location and an e-mail address. The card may also include attachments, which is particularly useful when a user is transmitting e-cards to another person. The e-card additionally contains credit card information. The credit card information, along with a signature also available on the e-card, allows the e-card to be used as a payment transfer mechanism. Further, the e-card includes the current location of the individual associated with the e-card.

In addition, the user-specific space is populated with information useful to the particular user. This may be done in the manner described in U.S. patent application Ser. No. 09/126,936 the disclosure of which is incorporated by reference.

In operation, in one embodiment the GPS server periodically transmits a request for, or probes, the location of a PCD. The PCD responds to the probe by providing position information to the GPS server. The GPS server provides the application server an indication of the PCD and an indication of the location of the PCD. The application server updates the user-specific space with the location of the PCD, or provides the location information to another computer system which performs the update.

The user of the PCD may also contact the application server, or other computer maintaining the PCD user-specific space, to review and modify data in the user-specific space. The user may also provide varying levels of access to data in the user-specific space, or the e-card, to both persons known and unknown to the user.

In one embodiment the GPS Server performs many of the functions of the system. Thus, in one embodiment the GPS Server performs probes of PCDs and receives preference updates from users, including contact phone numbers for the user. The GPS server sends updated user information to the application server which stores the information in the user-specific space, which in one embodiment is similar to an individual home page, which may be commonly found on the internet. The user calls a number associated with the GPS server to modify or review status or make additional requests and changes with respect to the user-specific space, and subscribers and parties requesting location and contact information on user are given information, which may vary

by the requester. The user makes the determination as to the access privileges provided requester, generally prior to their request.

The user of the user-specific space provides many benefits, including by providing a location for information concerning the individual. For example, in some embodiments the user-specific space includes tagged movie files, medical files, credit information attached to the contact card. In further embodiments the information may include smart caller ID, phone number calling ID, call forwarding techniques, Navigation information, navigation address books, navigation bookmarks, personal address books, contact manager software, schedule directors, e-mail, fax documents, voice mail are combined on the user's home page for easy access by the user/publisher. The user can arrange specific techniques for contacting him or his dynamic data from specific authorized subscribers.

The user-specific storage space therefore provides for storage and retrieval of e-cards. In addition, the space stores complete navigation information, maps, address books, persona files, navigation bookmarks, advertising bookmarks, smart contact bookmarks all GPS tagged, as well as providing Smart Contact manager, caller ID, Phone ID, call forwarding, call screening, e-mail system, Mail, Voice mail, dynamic data collection system from GPS server, advertising searching and smart bookmarking, and user schedule manager functions.

E-cards provide electronic card file of the user's personal information and attached movie files, complete attachment system from voice, data, fax e-911 medical, personal, and vehicle data system establishes contact and screening system for subscribers. A user updates the e_card, as well as other information on the space on occasion when contacted by GPS server.

FIG. **3** illustrates a communication flow block diagram between various components of systems in accordance with the present invention. The embodiment in FIG. **3** includes a subscriber server and a GPS server. The subscriber server and GPS server are in communication with various web servers over the Internet, as well as with mobile devices. As illustrated, the mobile devices include a cell phone, a PCD, and an automobile phone. Together, the subscriber server, GPS server, and the mobile devices comprise a mobile service system. The PCD and the automobile telephone system are both coupled to user-specific storage areas which provide additional information.

The GPS server and subscriber server are also coupled to numerous web servers over the Internet. For example, the subscriber server is coupled to a mobile support software system. The mobile support software system provides application information and programs to the mobile devices by way of the subscriber server as necessary.

The subscriber server is also coupled to a web server containing numerous user-specific storage spaces. The web server is also coupled to an additional application server containing numerous applications for use in configuring user information. The web server, and the user-specific storage space is also coupled to public users over the Internet. Public users may, for example, interrogate the user-specific space to determine the user's location or other information regarding the user. As discussed in U.S. patent application Ser. No. 09/126,936, the disclosure of which is incorporated by reference, security levels may be implemented so as to restrict the number of people who can access various information about the individual. The general public, and specifically business PC users, may also desire to provide information to the users of for example, PCDs or others moving in location. Accordingly, the general public may provide information to a fielded information web server. The fielded information web server makes location-specific information available to the GPS server, and thus the mobile users. This allows the mobile users for example, to interrogate the fielded information web server to determine the location of nearby places of business in which they may have an interest. This interest may be because they intended to visit the business, are due to a sudden change in circumstance which makes the mobile user desirous of visiting the business.

FIG. **4** further illustrates communication and function flow for a PCD. As illustrated, the PCD is in communication with an automobile user and the PCD is also in communication with the subscriber server. Communication with the subscriber server allows the PCD to obtain information regarding businesses, for example.

In accordance with aspects the present invention, the central computer system also maintains information in a database allowing individual users to be easily located both physically and in terms of their electronic communication locations. The central computer system maintains a database of individuals and an Internet address linked to each individual. The Internet address linked to each individual need not be a unique address, but instead many individuals may make use of a single computer indicated by the Internet address in the Internet address field. For example, for many cases the central computer system may be the computer system identified by the Internet address.

The system also contains a large number of computer systems linked by the Internet, and which are the computer systems pointed to by the address field for the individuals in the Internet address field. Each of these computers form a home site computer system. The responsibility of maintaining the home site computer systems are the responsibility of the individuals.

The home site computer system maintains electronic contact information and geographic location of the individual. The electronic contact information includes home telephone numbers, office telephone numbers, cellular telephone numbers, fax numbers, and e-mail addresses. The geographic location is provided in terms of latitude and longitude, although street addresses or site names can also be provided with the latitude and longitude.

Also linked to each electronic communication identifier in geographic location information is a security level index. In one embodiment, the security level index is a number between one and ten. The individual assigns security level indexes for each item of information. The user also identifies other individuals who may wish to contact the user, and indicates which security index level each such other individual should be provided. Other individuals who are not identified by the user are provided a default security level index. When the home site is contacted by another individual, the other individual provides an identifier, such as the individual's name to the home site. In one embodiment the other individual also provides a password to the home site so that the home site may authenticate the identity of the individual. Based on the identity of the individual, preferably authenticated, the home site determines the other individual's security level index.

The other individual is thereafter only able to obtain information for the other individual's security level index value and those values below the other individual's security level index. For example, a user's general office work number may be assigned a security level index of ten, with the user's direct line phone number provided a security level

index of six. A first other individual with a security index level of seven can only obtain the user's general office number while a second other individual with a security index level of six can also obtain the user's direct line phone number.

The user's geographic location is updated through the PCD. As previously discussed, the PCD can be used to provide e-mails indicative of the user's location in varying manners. When the user's home site computer system is identified as an e-mail address for such updates, the user's home site computer system may track the user over time. In one embodiment of the invention, the user's home site computer system is always provided a copy of any e-mail position updates provided by the PCD.

The present invention therefore provides a location-centric information system. Although the invention has been described with respect to certain specific embodiments, it should be appreciated that the invention may be practiced other than as specifically described.

What is claimed is:

1. A method of providing contact information regarding a user, the method comprising:

allocating a user-specific space in memory accessible over a computer network to a specific user;

associating a mobile communication device with the user;

determining a geographic location of the user by receiving location information provided by a mobile communication device;

storing data indicative of the location of the user in the user-specific space;

receiving, from the user, additional data regarding the user, the additional data being related to the geographic location of the user;

storing the additional data regarding the user in the user-specific space;

receiving from the user an access list of possible requesters of the data and the additional data;

storing the access list of possible requesters of the data and the additional data in the user-specific space; and

providing the data indicative of the location of the user and the additional data regarding the user to possible requesters on the access list.

2. A location relevant server system comprising:

a personal communication device (PCD) comprising a GPS receiver and wireless communication capability;

a GPS server receiving information indicating a geographic location and a unique identifier associated with the PCD, the GPS server providing the PCD location and the unique identifier associated with the PCD to an application server;

the application server configured to execute a program upon receiving the geographic location and the unique identifier information associated with the PCD to update a user specific data space with a current geographic location and the unique identifier associated with the PCD, the application server further configured to allow different users different access to the application sever based on the identity of a user;

wherein the application server is further configured to store information received from and concerning an individual associated with the PCD in the user specific data space, the stored information in the user specific data space including an access list of possible requesters of information concerning the individual associated with the PCD, the access list being received from the individual associated with the PCD; and

wherein the information stored in the user specific data space includes additional information related to the geographic location of the individual associated with the PCD.

3. The system according to claim **2** wherein the application server is further configured to provide the information concerning the individual to a requester.

4. The system according to claim **3** wherein the application server is further configured to modify data in the user specific data space.

5. The system according to claim **4** wherein the data in the user specific data space includes contact information regarding the individual.

6. The system according to claim **5** wherein the contact information regarding the individual includes, phone, fax, and e-mail information.

7. The system according to claim **4** wherein the application server is configured to provide different information concerning the individual to different requesters.

8. The system according to claim **2** wherein the GPS server is further configured to send PCD locations and identifiers to the application server.

9. The system according to claim **8** wherein the user specific data space stores contact information regarding a user associated with the PCD.

10. The system according to claim **9** wherein the contact information regarding the individual includes, phone, fax, and e-mail information.

11. A method of providing contact information regarding a user, the method comprising:

allocating a user-specific space in memory accessible over a computer network to a user;

associating a mobile communication device with the user;

receiving a plurality of user contact information from the user, each user contact information associated with a location of the user;

storing the plurality of user contact information in the user-specific space;

receiving a request from a requestor of information for user contact information;

determining a current location of the user by receiving current location information provided by a mobile communication device;

determining the user contact information associated with the current location of the user; and

providing the user contact information associated with the current location of the user to the requestor of information.

12. The method according to claim **11** further comprising:

receiving from the user an access list of possible requesters of information;

storing the access list in the user-specific space;

determining whether a requestor of information is on the access list upon receiving a request from the requestor of information for user contact information; and

providing the user contact information associated with the current location of the user if the requestor of information is on the access list.

* * * * *