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Wollrab

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(54) **FAMILY CALENDAR NOTIFICATION AND TRACKING**

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(58) **Field of Search** 455/456, 414, 455/266, 404; 342/357.11; 701/207, 208, 209; 340/990, 995

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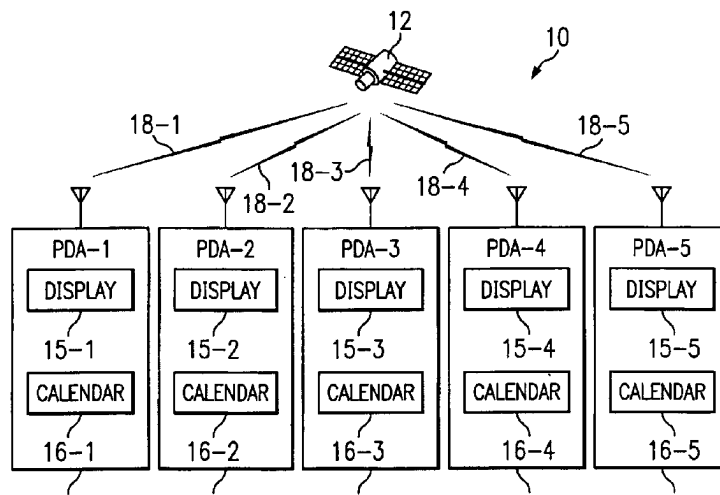
Primary Examiner—Fan Tsang

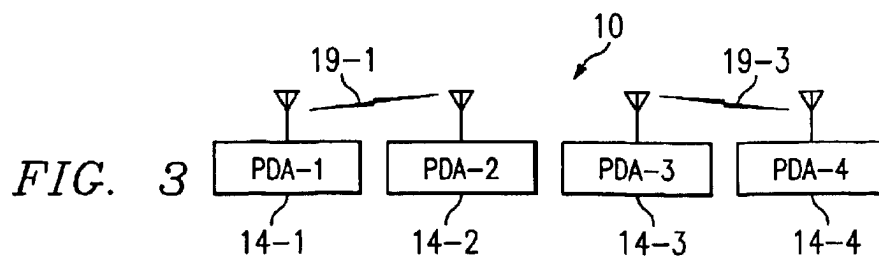
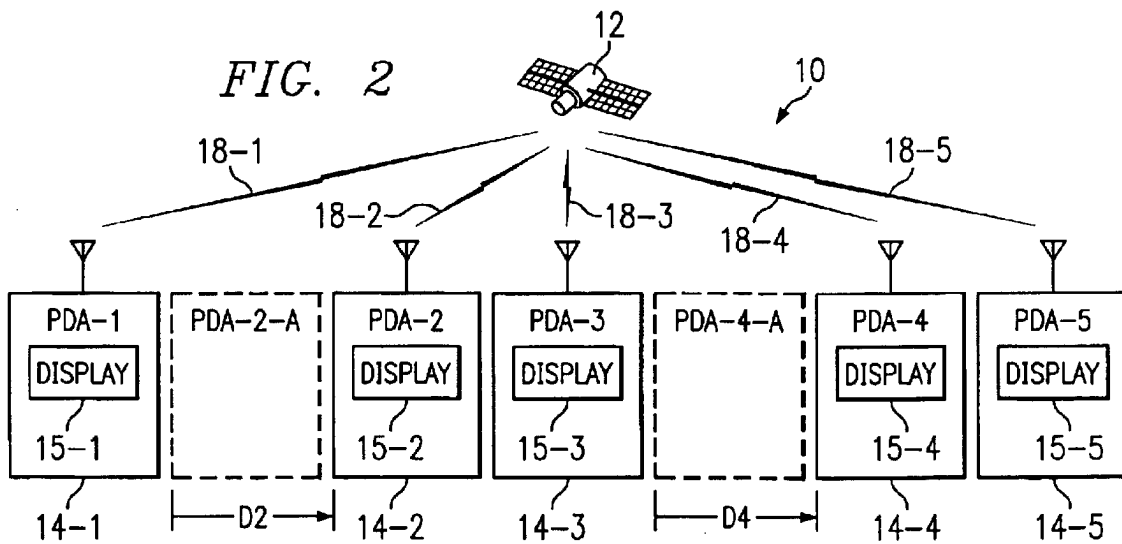
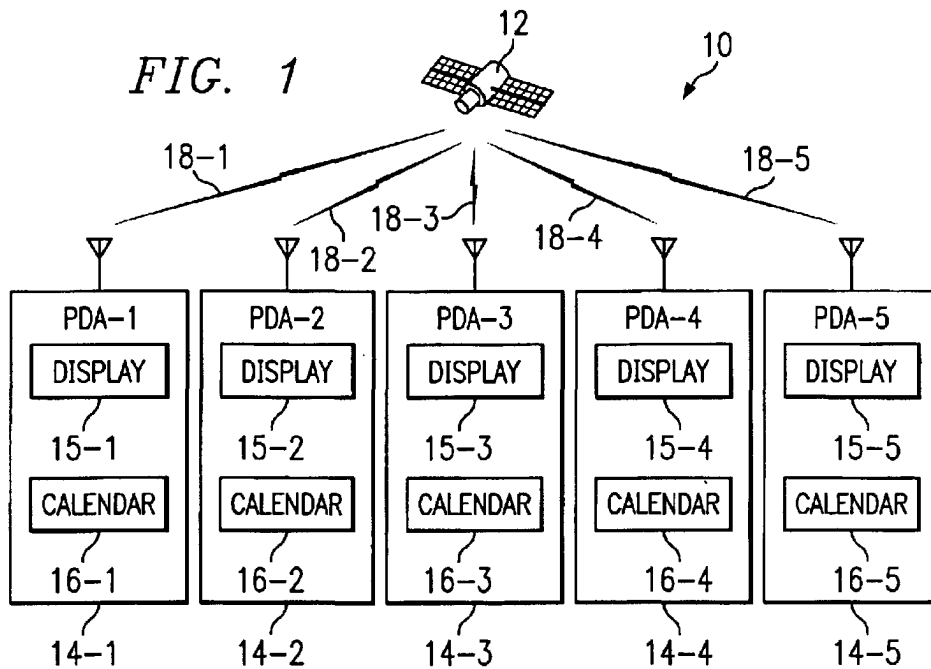
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(57) **ABSTRACT**

The present invention is directed to an electronic system and method for managing location, calendar, and event information. The system comprises at least two hand portable electronic devices, each having a display device to display personal profile, location, and event information, and means for processing, storing, and wirelessly communicating data. A software program running in the electronic device can receive local and remote input data; store, process, and update personal profile, event, time, and location information; and convert location information into coordinates of a graphic map display. The system additionally includes at least one earth orbiting satellite device using remote sensing technology to determine the location coordinates of the electronic device. The electronic devices receive synchronization messages broadcast by the satellite device, causing the software program to update the personal profile, event, time, and location information stored in each hand portable electronic device.

41 Claims, 2 Drawing Sheets





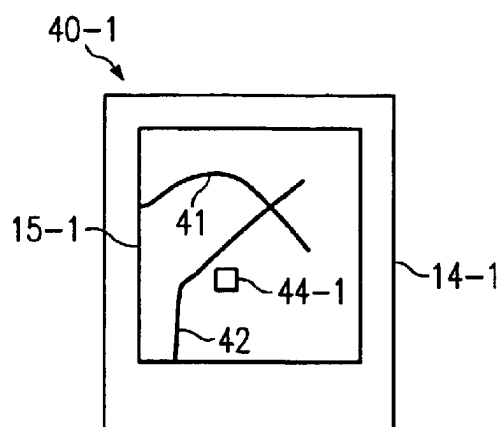


FIG. 4A

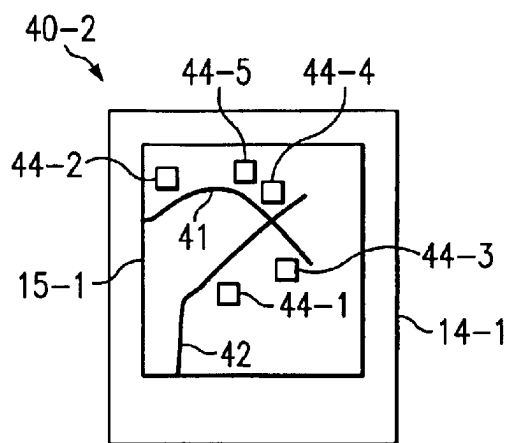


FIG. 4B

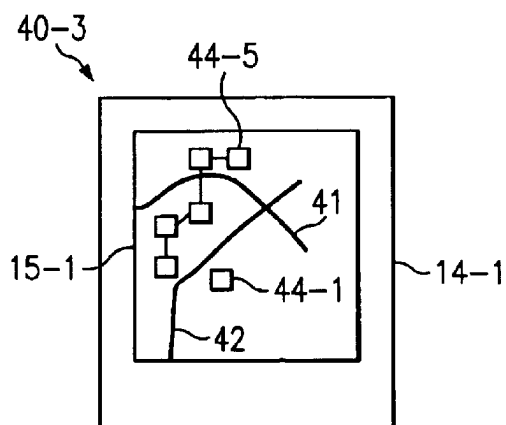


FIG. 4C

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FAMILY CALENDAR NOTIFICATION AND TRACKING

TECHNICAL FIELD

This application relates to wireless communication and tracking, and more particularly to family calendar notification and tracking.

BACKGROUND

In the present environment there are many different devices for communicating between people or between groups of people. However, even if everybody carried a wireless telephone or similar device, there is no efficient method for families or other groups to plan meetings/events and to communicate changes in individual plans that could affect the family meeting/event. For example, a child could be injured, and a parent making an unplanned detour to a hospital emergency room might not have time to tell/call everyone else to let them know of the change in plans.

Likewise, there is presently no efficient way of determining the location of a member of a family or other group. In one scenario, if a teenager borrows the family car on a Friday night, has a car wreck, and rolls off a cliff, nobody would know the location of the teenager. Assuming that the teenager was expected home at 2:00 a.m. and the parents were alarmed at 3:00 a.m., the parents would have no idea of the teenager's present location or any record of the last location of the teenager.

SUMMARY OF THE INVENTION

The present invention is directed to an electronic system and method for managing location, calendar, and event information. The system comprises at least two hand portable electronic devices, each having a display device to display personal profile, location, and event information, and means for processing, storing, and wirelessly communicating data. A software program running in the electronic device can receive local and remote input data; store, process, and update personal profile, event, time, and location information; and convert location information into coordinates of a graphic map display. The system additionally includes at least one earth orbiting satellite device using remote sensing technology to determine the location coordinates of the electronic device. The electronic devices receive synchronization messages broadcast by the satellite device, causing the software program to update the personal profile, event, time, and location information stored in each hand portable electronic device.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a high level schematic diagram illustrating the hardware architecture of a Family Calendar Tracking and Notification system, in accordance with embodiments of the present invention;

FIG. 2 is a schematic diagram illustrating the transmission of physical location information of PDA devices after a change of physical locations relative to those of FIG. 1;

FIG. 3 is a schematic diagram illustrating two-way direct wireless communication between PDA devices; and

FIGS. 4A-4C are schematic representations depicting exemplary map images on the display screen of a PDA device.

DETAILED DESCRIPTION

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Notification system, in accordance with embodiments of the present invention. Family Calendar Tracking and Notification system 10 includes one to many substantially identical personal digital assistant (PDA) devices represented by PDA devices PDA-1 through PDA-5 (PDA devices 14-1 through 14-5) and one or more satellite devices 12. PDA device 14-1 through 14-5 is an hand portable electronic device similar, for example, to commercially available Hewlett Packard Jornada™, Palm Pilot™, Handspring Visor™, Compaq iPaq™, Sony CLIE™, cellular and/or 'smart' wireless telephones, which is 2-way wireless communications capable and is remote sensing capable. Each PDA device 14-1 through 14-5 includes a respective display device 15-1 through 15-5.

Installed in each PDA device 14-1 through 14-5 is a copy of calendar 16-1 through 16-5, a software program which can store family member profiles, member calendars, member locations, and family profiles. Calendar 16-1 through 16-5 is capable of tracking and synchronizing events (appointments such as face-to-face or telephone meetings, sporting events, social events, etc), established by a member, e.g., user identified by a person's first name and last name, who is defined within a member profile which contains the member's personal information. Events preferably require uniquely associating a time and date with a physical location, which can be shared among a pre-defined family of members in order to facilitate members being able to meet, physically and/or virtually, at the same time, on the same date. The term "family" as defined herein is generalized to include not only biologically related individuals, but social, recreational, educational, professional, work, or other common interest groups of individual members that have a need or interest in maintaining close communication among themselves. Although typically a separate PDA device 14-1 through 14-5 is assigned to each individual family member, in some implementations a single PDA device can be shared among two or more family members.

PDA devices 14-1 through 14-5 communicate with one another via satellite device 12 and also by direct 2-way wireless communication. Satellite device 12 is a global communications device orbiting the earth substantially above the earth's atmosphere and capable of continuously (24 hours per day and 7 days per week) receiving information from and broadcasting information to (transceiving) one or more PDA devices 14-1 through 14-5 and its respective installed calendar 16-1 through 16-5. Satellite device 12 and PDA devices 14-1 through 14-5 collectively utilize remote sensing technology and interactive wireless communication to track the physical location of each PDA device 14-1 through 14-5.

In operation, calendar 16-1 through 16-5 stores information including member profiles, member calendars, member locations, and family profiles. Member profile(s) include information pertaining to individual members, for example:

email address—e.g., firstname_lastname@subdomain.domain;
member name—e.g., firstname lastname;
residence address—e.g., street, city, state/province, zip/postal code, country;
residence and/or other phone—e.g., dialing code and number;
FAX phone;
text-based notes—e.g., up to a defined number of characters;
other member-defined fields—e.g., date of birth, date of

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family membership—e.g. family name and/or alphanumeric identifying code/password.

Member copies of calendar 16-1 through 16-5 track and synchronize events identified by descriptive names, which provide the parent fields for attendees, event location, time and date. An event location includes physical address, e.g., street address, city, state/province, zip/postal code, country, and REMOTE SENSING location coordinates, e.g., latitude-longitude coordinates (degrees, minutes, seconds), which are the basis of a vector-based Geographic Information System [GIS] data set, where data are stored as a sequence of precise X,Y coordinates and vectors which can be displayed as a map image on PDA device 14-1 through 14-5, as described below in more detail. Other event location data include phone number at the event location and/or phone number of a designated event contact individual, and Internet URL for an electronic meeting room.

Member location(s) are preferably stored in calendar 16-1 through 16-5 as remote sensing location coordinates defined above, and are updated periodically for each member. In some embodiments, multiple sequential sets of remote sensing location coordinates are stored for each member to create a historical tracking record of movement for the member/PDA device. This can be retrieved later to determine where a member/PDA device has been physically located over time for such purposes as tracking member movements or locating a lost member. Calendar 16-1 through 16-5 can translate remote sensing location coordinates into a graphic map image, e.g. a .jpg or .gif file, depicting the relative locations of all members/PDA devices within a family. In a family profile, calendar 16-1 through 16-5 stores an alpha-numeric family name/identifier and a list of all members, for example, in order of their email address.

Calendar 16-1 through 16-5 preferably generates information requests, including membership requests from within the family requesting a membership status for a non-member and from non-members requesting to join a specified family. Calendar 16-1 through 16-5 additionally generates synchronization requests from members, requesting synchronization within a family, for example to update member profile information, update member calendar information, update member location information, and/or update family profile information; and from within calendar 16-1 through 16-5 requesting synchronization among a family and or with a member to update the above information among the family or a subset of the family.

Calendar 16-1 through 16-5 preferably sends to and/or routes to and receives from satellite device 12 in encrypted format any of the information in the member profile, member calendar, member location, and or family profile destined for member(s) email address. Calendar 16-1 through 16-5 processes queries, sorts requests, and synchronizes calendars among members within a family/group. FIGS. 1 and 2 illustrate communication between calendars 16-1 through 16-5 in PDA devices 14-1 through 14-5 via satellite device 12 over wireless data paths 18-1 through 18-5 respectively, for example to synchronize calendars 16-1 through 16-5. Calendar synchronization occurs at regular intervals, e.g. at 5-minute intervals. Calendar 16 generates a new family code or password periodically, for example each time family membership changes, and distributes it to each family member's profile. Calendar 16-1 through 16-5 displays via display devices 15-1 through 15-5 information including the respective member's profile, location, and

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Satellite device 12 preferably receives, processes and stores information sent from individual PDA devices 14-1 through 14-5 into vector-based remote sensing data representing the physical location of the PDA device, and broadcasts information simultaneously to multiple PDA devices 14-1 through 14-5. The updated physical location information is transmitted in accordance with an established schedule (e.g. every 5 minutes) to specific member PDA devices or to all PDAs within a defined family for synchronizing/replication. This transmission can be sent either directly via infrared or other wireless link from one PDA to another PDA in sufficient proximity or to satellite device 12 for rebroadcast to all PDA devices within a defined family. FIG. 2 is a schematic diagram illustrating the transmission of physical location information of PDA devices after a change of physical locations relative to those of FIG. 1. In FIG. 2, PDA device 14-2 has moved through a displacement D2 relative to its previous position PDA-2-A and PDA device 14-4 has likewise moved through a displacement D4 relative to its previous position PDA-4-A. As illustrated in FIG. 2, remote sensing coordinates reflecting the movements of PDA devices 14-2 and 14-4 are broadcast by satellite device 12 to all PDA devices 14-1 through 14-5 of system 10.

PDA device 14-1 through 14-5 stores and runs calendar software program 16-1 through 16-5 used to manage all information storage and transfers between PDA devices 14-1 through 14-5 via satellite device 12. PDA devices 14-1 through 14-5 communicate directly with one another over wireless data paths 19-1, 19-3 as illustrated in FIG. 3, to exchange stored information/data using, for example, infrared technology. Alternatively, PDA devices 14-1 through 14-5 communicate with one another using one or more of other short distance wireless technologies, for example, cellular technology or Bluetooth™ technology which, unlike infrared, are not restricted to line of sight transmission. In some embodiments, wireless portions of data paths between PDA devices 14-1 through 14-5 are interconnected through terrestrial wired network portions, for example telephone cable and/or the public Internet.

PDA devices 14-1 through 14-5 can utilize wireless remote sensing technology to establish and communicate remote sensing data between PDA device 14-1 through 14-5 and satellite device 12. PDA device 14-1 through 14-5 can display a map image via display device 15-5 through 15-5 depicting the relative locations of all members/PDA devices within a family. FIGS. 4A-4C are schematic representations depicting exemplary map images 40-1 through 40-3 on the screen of display device 15-1 of PDA device 14-1. In map image 40-1 the location 44-1 of family member/PDA device 14-1 is shown relative to physical features, for example roads 41 and 42. In map image 40-2 the locations 44-1 through 44-5 of five family members/PDA devices 14-1 through 14-5 respectively are shown simultaneously relative to one another and relative to roads 41, 42. In map image 40-3 symbols interconnected with location 44-5 depict sequential historical locations of family member/PDA device 14-5 relative to location 44-1 of PDA device 14-1 and roads 41, 42.

Calendar 16-1 through 16-5 utilizes existing technologies, for example Lotus Notes/Domino and/or Microsoft Outlook/Exchange can provide a base software program to achieve the calendar functions described above. Calendar 16-1 through 16-5 additionally includes software to receive, process, and store physical location information (vector-based remote sensing coordinates), which can be updated

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