METHODS AND SYSTEMS FOR CONDUCTING RESEARCH OPERATIONS

[0001] CROSS-RELATED APPLICATIONS

[0002] This application claims the benefit of U.S. provisional patent application No. 60/751,825, filed December 20, 2005, in the names of Alan R. Neuhauser, Vijoy K. Gopalakrishnan, Jack C. Crystal, Jack K. Zhang, and Eugene L. Flanagan III.

[0003] BACKGROUND OF THE INVENTION

[0004] Collecting data reflecting usage of media is an increasingly complex task as the variety of media sources and techniques for presenting media to consumers, and the numbers and types of media presentation venues, increase over time.

[0005] A convergence of personal communications capabilities and multimedia options in a single portable device is occurring presently, such as in a cellular telephone, a personal digital assistant, and the like. Increasingly, consumers are accessing and consuming media "on the go" and out-of-home using such portable devices, and as the quality of media presented by such devices is improved, it can be expected that such mobile consumption of media will increase.

[0006] The above trends in media usage, in addition to conventional in-home consumption demonstrate a need for new techniques for monitoring exposure to media of various types presented to consumers in a greater variety of ways than in the past.

[0007] Dedicated portable monitoring devices have been developed including the hardware and software required to monitor exposure to audio media. It has been proposed to monitor exposure of consumers to audio media

by incorporating monitoring software for instance in a cellular telephone, making use of the cellular telephone's hardware, including its microphone, CPU, memory capacity and communications capabilities.

[0008] DISCLOSURE

[0009] For this application the following terms and definitions shall apply:

[00010] The term "data" as used herein means any indicia, signals, marks, symbols, domains, symbol sets, representations, and any other physical form or forms representing information, whether permanent or temporary, whether visible, audible, acoustic, electric, magnetic, electromagnetic or otherwise manifested. The term "data" as used to represent predetermined information in one physical form shall be deemed to encompass any and all representations of corresponding information in a different physical form or forms.

[00011] The terms "media data" and "media" as used herein mean data which is widely accessible, whether over-the-air, or via cable, satellite, network, internetwork (including the Internet), print, displayed, distributed on storage media, or by any other means or technique that is humanly perceptible, without regard to the form or content of such data, and including but not limited to audio, video, text, images, animations, databases, files, broadcasts, displays (including but not limited to video displays, posters and billboards), signs, signals, web pages, print media and streaming media data.

[00012] The term "presentation data" shall mean media data or content other than media data to be presented to a user.

[00013] The term "research data" as used herein means data comprising (1) data concerning usage of media, (2) data concerning exposure to media, and/or (3) market research data.

[00014] The terms "gather" and "gathering" as used herein include both directly gathering data with the use of a device as well as emitting data from a device that causes or enables another device to gather data.

[00015] The term "research operation" as used herein means an operation comprising gathering, storing and/or communicating research data.

[00016] The term "database" as used herein means an organized body of related data, regardless of the manner in which the data or the organized body thereof is represented. For example, the organized body of related data may be in the form of a table, a map, a grid, a packet, a datagram, a file, an e-mail, a message, a document, a list or in any other form.

[00017] The term "network" as used herein includes both networks and internetworks of all kinds, including the Internet, and is not limited to any particular network or internetwork.

[00018] The terms "first," "second," "primary," and "secondary" are used herein to distinguish one element, set, data, object, step, process, function, action or thing from another, and are not used to designate relative position, arrangement in time or relative importance, unless otherwise stated explicitly.

[00019] The terms "coupled", "coupled to", and "coupled with" as used herein each mean a relationship between or among two or more devices, apparatus, files, circuits, elements, functions, operations, processes, programs, media, components, networks, systems, subsystems, and/or means, constituting any one or more of (a) a connection, whether direct or through one or more other devices, apparatus, files, circuits, elements, functions, operations, processes,

programs, media, components, networks, systems, subsystems, or means, (b) a communications relationship, whether direct or through one or more other devices, apparatus, files, circuits, elements, functions, operations, processes, programs, media, components, networks, systems, subsystems, or means, and/or (c) a functional relationship in which the operation of any one or more devices, apparatus, files, circuits, elements, functions, operations, processes, programs, media, components, networks, systems, subsystems, or means depends, in whole or in part, on the operation of any one or more others thereof.

[00020] The terms "communicate", and "communicating" as used herein include both conveying data from a source to a destination, and delivering data to a communications medium, system, channel, device, wire, cable, fiber, circuit or link to be conveyed to a destination, and the term "communication" as used herein means data so conveyed or delivered. The term "communications' as used herein includes one or more of a communications medium, system, channel, device, wire, cable, fiber, circuit and link.

[00021] The term "processor" as used herein means processing devices, apparatus, programs, circuits, components, systems and subsystems, whether implemented in hardware, software or both, and whether or not programmable. The term "processor" as used herein includes, but is not limited to computers, hardwired circuits, signal modifying devices and systems, devices and machines for controlling systems, central processing units, programmable devices, field programmable gate arrays, application specific integrated circuits, systems on a chip, systems comprised of discrete elements and circuits, state machines, virtual machines and combinations of any of the foregoing.

[00022] The terms "storage" and "data storage" as used herein mean data storage devices, apparatus, programs, circuits, components, systems, subsystems and storage media serving to retain data, whether on a temporary or permanent basis, and to provide such retained data.

[00023] The terms "panelist," "panel member" and "participant" are interchangeably used herein to refer to a person who is, knowingly or unknowingly, participating in a study to gather information, whether by electronic, survey or other means, about that person's activity.

[00024] The term "household" as used herein is to be broadly construed to include family members, a family living at the same residence, a group of persons related or unrelated to one another living at the same residence, and a group of persons living within a common facility (of which the total number of unrelated persons does not exceed a predetermined number), such as a fraternity house, an apartment or other similar structure or arrangement.

[00025] The term "portable user appliance" (also referred to herein, for convenience, by the abbreviation "PUA") as used herein means an electrical or non-electrical device capable of being carried by or on the person of a user or capable of being disposed on or in, or held by, a physical object (e.g., attaché, purse) capable of being carried by or on the user, and having at least one function of primary benefit to such user, including without limitation, a cellular telephone, a personal digital assistant ("PDA"), a Blackberry device, a radio, a television, a game system (e.g., a Gameboy ® device), a notebook computer, a laptop computer, a GPS device, an iPod ® device, a DVD player, a walkie talkie, a personal communications device, a telematics device, a remote control device, a wireless headset, a wristwatch, a portable data storage device (e.g., Thumb ™ drive), a camera, a recorder, a keyless entry transmitter device, a ring, a comb, a pen, a pencil, a notebook, a wallet, a tool, an implement, a pair of glasses, an article of clothing, a belt, a belt buckle, a fob, an article of jewelry, an ornamental article, a pair of shoes or other foot garment (e.g., sandals), a jacket, and a hat, as well as any devices combining any of the foregoing or their functions.

[00026] The term "activation message" as used herein shall mean data comprising at least one of (1) an activation command for a PUA for

activating a capability of the PUA to perform a research operation, (2) activation data for a PUA for enabling and/or providing a capability of the PUA to perform a research operation, (3) visual display data for a PUA including a message soliciting participation of a user of the PUA in a research operation, (4) activation request data for a PUA requesting activation, enablement or installation of a capability thereof to perform a research operation, (5) a message for a user of a PUA requesting an action thereof to activate, enable and/or install a capability of the PUA to perform a research operation, and/or providing instructions for participating in a research operation automatically by means of a PUA, (6) a message for a user of a PUA providing or offering to provide a benefit to the user in exchange for the user's participation in a research operation, and (7) a message to a PUA and/or a user of a PUA requesting communication of a participation message in response.

[00027] The term "maintenance message" as used herein shall mean data comprising at least one of (1) a test command for a PUA to control an operation thereof to test its operational status or ability to perform a research operation, (2) test data for a PUA to establish, enable or provide a capability thereof to test its operational status or ability to perform a research operation, (3) a message requesting a response from a user of a PUA identifying such user, and/or providing demographic or other user-specific data of the user, (4) a message requesting system data of the PUA, and (5) a command or request for a PUA to perform a research operation.

[00028] The term "termination message" as used herein shall mean data comprising at least one of: (1) a deactivation message for a PUA to deactivate a capability thereof to perform a research operation; (2) a deactivation message for a user of a PUA instructing them to deactivate a capability of the PUA to perform a research operation; and (3) providing a benefit to a person as a final consideration for the person's previous participation in a research operation, or notifying the person that such a benefit will be or has been provided.

[00029] The term "participation message" as used herein shall mean data comprising at least one of (1) research data gathered automatically by a PUA, (2) a message from a PUA indicating an operational status or ability thereof to perform a research operation, or providing results of a test of such operational status or ability, (3) a message from a user of a PUA concerning participation of the user in a research operation by means of a PUA, or ancillary to such participation, such as concerning a benefit provided to the user for such participation or indicating activation or deactivation of an ability of a PUA to perform a research operation, (4) a message from a user of a PUA identifying such user and/or providing demographic and/or other user-specific data of the user, (5) a message providing system data of the PUA, (6) a message from a benefit provider concerning a benefit provided or to be provided to a user of a PUA for participation in a research operation, such as a message indicating receipt of a benefit request or a termination message requesting a benefit, and (7) a message from a PUA indicating receipt thereby of an activation message, a maintenance message or a termination message.

[00030] Methods and systems are disclosed herein in conjunction with the accompanying drawings, in which:

[00031] Figure 1 is a block diagram of a PUA modified to carry out research operations;

[00032] Figure 1A is a functional block diagram for use in explaining certain embodiments involving the use of the PUA of Figure 1;

[00033] Figure 1B is a block diagram of a system for setting up, promoting, operating, maintaining and/or terminating research operations with the use of multiple PUA's, such as that illustrated in Figure 1;

[00034] Figure 2 is a block diagram of a PUA in communication with a research system;

[00035] Figure 2A is an exploded view of a PUA with a research data monitor affixed thereto;

[00036] Figure 2B is a block diagram illustrating the PUA of Figure 2A coupled with the research data monitor thereof;

[00037] Figure 2C is a block diagram of the research data monitor of Figures 2A and 2B;

[00038] Figure 2D is a layout diagram of an embodiment of the research data monitor of Figures 2A, 2B and 2C;

[00039] Figure 2E is a block diagram of a PUA communicating with the research data monitor of Figures 2A, 2B and 2C;

[00040] Figure 3 is a block diagram of a personal digital assistant (PDA) modified to carry out research operations;

[00041] Figure 4 is a block diagram of an external storage device modified to carry out research operations;

[00042] Figure 5 illustrates a pen in phantom lines, having a research data collection system therein which serves to carry out research operations;

[00043] Figure 6 is a block diagram of the research data collection system of Figure 5;

[00044] Figure 7A illustrates a relational database between PUA users and a group of persons receiving communication services pursuant to a single agreement;

[00045] Figure 7B illustrates a relational database between PUA users and demographic data of the PUA users;

[00046] Figure 8 illustrates an example of a signature extraction technique; and

[00047] Figure 9 is a schematic diagram of still further systems and processes for carrying out research operations with the use of personal user appliances (PUA's).

[00048] A method for setting up, promoting, operating, maintaining and/or terminating a research operation carried out automatically with the use of a PUA, comprises communicating a message to a PUA and/or to a user of a PUA comprising at least one of instructions for participating in a research operation carried out automatically by means of the PUA, a message for the user of the PUA providing or offering to provide a benefit to the user in exchange for the user's participation in a research operation, a message requesting a response from the user identifying the user, and a command or a request for the PUA to automatically gather, store and/or communicate research data; and receiving a participation message from at least one of the PUA, the user of the PUA and the benefit provider.

[00049] A method for setting up, promoting, operating, maintaining and/or terminating a research operation carried out automatically with the use of a PUA, comprises communicating at least one of an activation message, a maintenance message and a termination message to a PUA, to a user of a PUA and/or to a benefit provider; and receiving a participation message from at least one of the PUA, the user of the PUA and the benefit provider; and wherein the participation message comprises at least one of a message from the PUA indicating an operational status or ability thereof to carry out a research operation, a message from the PUA indicating an availability thereof to carry out

a research operation, and a message from the user of the PUA identifying the user.

[00050] A method for setting up, promoting, operating, maintaining and/or terminating a research operation carried out automatically with the use of a PUA, comprises communicating at least one of an activation message, a maintenance message and a termination message to a PUA, to a user of a PUA and/or to a benefit provider; and receiving a participation message from at least one of the PUA, the user of the PUA and the benefit provider; and further comprising communicating a termination message to at least one of the PUA and a benefit provider.

[00051] A method of gathering research data, comprises receiving a message from a user's PUA including research data and identification data identifying the user's PUA; and storing the research data, together with an identification of the user's PUA from which it was received.

[00052] A method of recruiting a person to participate in a research operation, comprises communicating a recruitment message as media data to a plurality of PUA users to solicit participation in the research operation; and receiving a participation message from a PUA of a user who received the recruitment message.

[00053] A method of recruiting persons within a population to participate in a research operation, comprises obtaining a list of cellular telephone numbers of persons within a population; communicating a message addressed to at least some telephone numbers in the cellular telephone number list soliciting participation of persons in a research operation; and communicating a message to cellular telephones corresponding to the at least some telephone numbers to initiate, provide or enable a capability of the cellular telephones to carry out a research operation.

[00054] A method of recruiting PUA users within a population to participate in a research operation, comprises communicating a recruitment message to PUA's of PUA users within a population to solicit participation in the research operation; and if a response to the recruitment message is received from a PUA user indicating an unwillingness to participate in the research operation or if no response thereto is received, storing negative data indicating a failure to recruit the PUA user to participate in the research operation and subsequently communicating a further recruitment message to the PUA user to solicit participation in the research operation.

[00055] A method of administering surveys to persons for gathering research data, comprises communicating a first survey including a first number of questions to a person; receiving a response to the first survey from the person; based on the response, selecting a second survey including a second number of survey questions, the second number of survey questions being fewer than the first number of survey questions; and communicating the second survey to the participant.

[00056] A method of terminating participation of a person in a research operation carried out by means of a PUA used by the person, comprises at least one of: (1) communicating a deactivation message to the PUA used by the person to deactivate a capability thereof to carry out a research operation; (2) communicating a deactivation message to the person instructing them to deactivate a capability of the PUA to carry out a research operation; and (3) providing a benefit to the person as a final consideration for the person's previous participation in the research operation.

[00057] A method of operating a PUA in the course of setting up, operating, maintaining and/or terminating a research operation carried out automatically with the use of the PUA, comprises receiving a maintenance message in a PUA including at least one of a message requesting a response from the user identifying the user and a command or request to the PUA to

automatically gather, store and/or communicate research data; and communicating a participation message from the PUA.

[00058] A method of operating a PUA in the course of setting up, operating, maintaining and/or terminating a research operation carried out automatically with the use of the PUA, comprises receiving a termination message in a PUA; and communicating a participation message from the PUA.

[00059] A method of terminating participation of a person in a research operation by means of a PUA used by the person, comprises at least one of: (1) receiving a deactivation message in the PUA used by the person to deactivate a capability thereof to carry out a research operation; and (2) inputting a deactivation command in the PUA instructing it to deactivate a capability thereof to carry out a research operation.

[00060] A method of recruiting a user of a PUA to participate in a research operation, comprises communicating a participation message from the PUA of the user relating to participation in a research operation; and communicating, in response to a message from the user, an initiation message to the PUA of the user to initiate, enable or establish a capability of the PUA to carry out a research operation; further comprising communicating at least one of a data collection type to the PUA of the user specifying a type of data to collect by means of the PUA, calibration data to the PUA for use in calibrating an operation of the PUA and destination data to the PUA specifying a destination for research data gathered or received by the PUA..

[00061] A method of terminating participation of a PUA user in a research operation by means of a PUA of the user, comprises receiving a deactivation message in the PUA comprising data for deactivating at least one function of the PUA to carry out a research operation, without deactivating at least one additional function of the PUA to carry out a research operation; and

providing a control operable by the PUA user to deactivate the at least one additional function of the PUA.

[00062] A method of initiating participation of a PUA user in a research operation using multiple PUA's, comprises assigning user identification data to the user; associating the user identification data with data identifying multiple PUA's used by the user; and at least one of (1) activating or enabling each of the multiple PUA's to carry out a research operation, and (2) receiving research data from plural ones of the multiple PUA's.

[00063] Numerous types of research operations are possible, including, without limitation, television and radio program audience measurement; exposure to advertising in various media, such as television, radio, print and outdoor advertising, among others; consumer spending habits; consumer shopping habits including the particular retail stores and other locations visited during shopping and recreational activities; travel patterns, such as the particular routes taken between home and work, and other locations; consumer attitudes, awareness and preferences; and so on. For the desired type of media and/or market research operation to be conducted, particular activity of individuals is monitored, or data concerning their attitudes, awareness and/or preferences is gathered. In certain embodiments research data relating to two or more of the foregoing are gathered, while in others only one kind of such data is gathered.

[00064] Various monitoring techniques are suitable. For example, television viewing or radio listening habits, including exposure to commercials therein, are monitored utilizing a variety of techniques. In certain techniques, acoustic energy to which an individual is exposed is monitored to produce data which identifies or characterizes a program, song, station, channel, commercial, etc. that is being watched or listened to by the individual. Where audio media includes ancillary codes that provide such information, suitable decoding techniques are employed to detect the encoded information, such as those

disclosed in US Patents No. 5,450,490 and No. 5,764,763 to Jensen, et al., U.S. Patent No. 5,579,124 to Aijala, et al., U.S. Patent Nos. 5,574,962, 5,581,800 and 5,787,334 to Fardeau, et al., U.S. Patent No. 6,871,180 to Neuhauser, et al., U.S. Patent No. 6,862,355 to Kolessar, et al., U.S. Patent No. 6,845,360 to Jensen, et al., U.S. Patent No. 5,319,735 to Preuss et al., US Patent No. 5,687,191 to Lee, et al., U.S. Patent No. 6,175,627 to Petrovich et al., U.S. Patent No. 5,828,325 to Wolosewicz et al., U.S. Patent No. 6,154,484 to Lee et al., U.S. Patent No. 5,945,932 to Smith et al., US 2001/0053190 to Srinivasan, US 2003/0110485 to Lu, et al., U.S. Patent No. 5,737,025 to Dougherty, et al., US 2004/0170381 to Srinivasan, and WO 06/14362 to Srinivasan, et al., all of which hereby are incorporated by reference herein.

[00065] Examples of techniques for encoding ancillary codes in audio, and for reading such codes, are provided in Bender, et al., "Techniques for Data Hiding", *IBM Systems Journal*, Vol. 35, Nos. 3 & 4, 1996, which is incorporated herein in its entirety. Bender, et al. disclose a technique for encoding audio termed "phase encoding" in which segments of the audio are transformed to the frequency domain, for example, by a discrete Fourier transform (DFT), so that phase data is produced for each segment. Then the phase data is modified to encode a code symbol, such as one bit. Processing of the phase encoded audio to read the code is carried out by synchronizing with the data sequence, and detecting the phase encoded data using the known values of the segment length, the DFT points and the data interval.

[00066] Bender, et al. also describe spread spectrum encoding and decoding, of which multiple embodiments are disclosed in the above-cited Aijala, et al. US patent No. 5,579,124.

[00067] Still another audio encoding and decoding technique described by Bender, et al. is echo data hiding in which data is embedded in a host audio signal by introducing an echo. Symbol states are represented by the

values of the echo delays, and they are read by any appropriate processing that serves to evaluate the lengths and/or presence of the encoded delays.

[00068] A further technique, or category of techniques, termed "amplitude modulation" is described in R. Walker, "Audio Watermarking", BBC Research and Development, 2004. In this category fall techniques that modify the envelope of the audio signal, for example by notching or otherwise modifying brief portions of the signal, or by subjecting the envelope to longer term modifications. Processing the audio to read the code can be achieved by detecting the transitions representing a notch or other modifications, or by accumulation or integration over a time period comparable to the duration of an encoded symbol, or by another suitable technique.

[00069] Another category of techniques identified by Walker involves transforming the audio from the time domain to some transform domain, such as a frequency domain, and then encoding by adding data or otherwise modifying the transformed audio. The domain transformation can be carried out by a Fourier, DCT, Hadamard, Wavelet or other transformation, or by digital or analog filtering. Encoding can be achieved by adding a modulated carrier or other data (such as noise, noise-like data or other symbols in the transform domain) or by modifying the transformed audio, such as by notching or altering one or more frequency bands, bins or combinations of bins, or by combining these methods. Still other related techniques modify the frequency distribution of the audio data in the transform domain to encode. Psychoacoustic masking can be employed to render the codes inaudible or to reduce their prominence. Processing to read ancillary codes in audio data encoded by techniques within this category typically involves transforming the encoded audio to the transform domain and detecting the additions or other modifications representing the codes.

[00070] A still further category of techniques identified by Walker involves modifying audio data encoded for compression (whether lossy or lossless) or other purpose, such as audio data encoded in an MP3 format or

other MPEG audio format, AC-3, DTS, ATRAC, WMA, RealAudio, Ogg Vorbis, APT X100, FLAC, Shorten, Monkey's Audio, or other. Encoding involves modifications to the encoded audio data, such as modifications to coding coefficients and/or to predefined decision thresholds. Processing the audio to read the code is carried out by detecting such modifications using knowledge of predefined audio encoding parameters.

[00071] It will be appreciated that various known encoding techniques may be employed, either alone or in combination with the above-described techniques. Such known encoding techniques include, but are not limited to FSK, PSK (such as BPSK), amplitude modulation, frequency modulation and phase modulation.

[00072] In some cases a signature is extracted from transduced media data for identification by matching with reference signatures of known media data. Suitable techniques for this purpose include those disclosed in U.S. Patent No. 5,612,729 to Ellis, et al. and in U.S. Patent No. 4,739,398 to Thomas, et al., each of which is assigned to the assignee of the present application and both of which are incorporated herein by reference in their entireties.

[00073] Still other suitable techniques are the subject of U.S. Patent No. 2,662,168 to Scherbatskoy, U.S. Patent No. 3,919,479 to Moon, et al., U.S. Patent No. 4,697,209 to Kiewit, et al., U.S. Patent No. 4,677,466 to Lert, et al., U.S. Patent No 5,512,933 to Wheatley, et al., U.S. Patent No. 4,955,070 to Welsh, et al., U.S. Patent No. 4,918,730 to Schulze, U.S. Patent No. 4,843,562 to Kenyon, et al., U.S. Patent No. 4,450,551 to Kenyon, et al., U.S. Patent No. 4,230,990 to Lert, et al., U.S. Patent No. 5,594,934 to Lu, et al., European Published Patent Application EP 0887958 to Bichsel and PCT publication WO91/11062 to Young, et al., all of which are incorporated herein by reference in their entireties.

[00074] An advantageous signature extraction technique transforms audio data within a predetermined frequency range to the frequency domain by a transform function, such as an FFT. The FFT data from an even number of frequency bands (for example, eight, ten, sixteen or thirty two frequency bands) spanning the predetermined frequency range are used two bands at a time during successive time intervals. Figure 8 provides an example of how pairs of the bands are selected during successive time intervals where the total number of bands used is equal to ten. The selected bands are indicated by an "X".

[00075] When each band is selected, the energy values of the FFT bins within such band and such time interval are processed to form one bit of the signature. If there are ten FFT's for each interval of the audio signal, for example, the values of all bins of such band within the first five FFT's are summed to form a value "A" and the values of all bins of such band within the last five FFT's are summed to form a value "B". In the case of a received broadcast audio signal, the value A is formed from portions of the audio signal that were broadcast prior to those used to form the value B.

[00076] To form a bit of the signature, the values A and B are compared. If B is greater than A, the bit is assigned a value "1" and if A is greater than or equal to B, the bit is assigned a value of "0". Thus, during each time interval, two bits of the signature are produced.

[00077] One advantageous technique carries out either or both of code detection and signature extraction remotely from the location where the research data is gathered, as disclosed in US Published Patent Application 2003/0005430 published January 2, 2003 to Ronald S. Kolessar, which is assigned to the assignee of the present application and is hereby incorporated herein by reference in its entirety.

[00078] If location tracking or exposure to outdoor advertising is carried out, then various techniques for doing so are employed. Suitable

techniques for location tracking or monitoring exposure to outdoor advertising are disclosed in US Patent No 6,958,710 in the names of Jack K. Zhang, Jack C. Crystal, and James M. Jensen, issued October 25, 2005, and US Published Patent Application 2005/0035857 A1 published February 17, 2005 in the names of Jack K. Zhang, Jack C. Crystal, James M. Jensen and Eugene L. Flanagan III, filed August 13, 2003, all of which are assigned to the assignee of the present application and hereby incorporated by reference herein in their entireties.

[00079] Where usage of publications, such as periodicals, books, and magazines, is monitored, suitable techniques for doing so are employed, such as those disclosed in U.S. Patent Application No. 11/084,481 in the names of James M. Jensen, Jack C. Crystal, Alan R. Neuhauser, Jack Zhang, Daniel W. Pugh, Douglas J. Visnius, and Eugene L. Flanagan III, filed March 18, 2005, which is assigned to the assignee of the present application and hereby incorporated by reference herein in its entirety.

[00080] In addition to those types of research data mentioned above and the various techniques identified for gathering such types of data, other types of research data may be gathered and other types of techniques may be employed. For example, research data relating to consumer purchasing conduct, consumer product return conduct, exposure of consumers to products and presence and/or proximity to commercial establishments may be gathered, and various techniques for doing so may be employed. Suitable techniques for gathering data concerning presence and/or proximity to commercial establishments are disclosed in US Published Patent Application 2005/0200476 A1 published September 15, 2005 in the names of David Patrick Forr, James M. Jensen, and Eugene L. Flanagan III, filed March 15, 2004, and in US Published Patent Application 2005/0243784 A1 published November 3, 2005 in the names of Joan Fitzgerald, Jack Crystal, Alan Neuhauser, James M. Jensen, David Patrick Forr, and Eugene L. Flanagan III, filed March 29, 2005. Suitable techniques for gathering data concerning exposure of consumers to products are

disclosed in US Published Patent Application 2005/0203798 A1 published September 15, 2005 in the names of James M. Jensen and Eugene L. Flanagan III, filed March 15, 2004.

[00081] Moreover, techniques involving the active participation of the panel members may be used in research operations. For example, surveys may be employed where a panel member is asked questions utilizing the panel member's PUA after recruitment. Thus, it is to be understood that both the exemplary types of research data to be gathered discussed herein and the exemplary manners of gathering research data as discussed herein are illustrative and that other types of research data may be gathered and that other techniques for gathering research data may be employed.

[00082] Various PUA's already have capabilities sufficient to enable the implementation of the desired monitoring technique or techniques to be employed during the research operation. As an example, cellular telephones have microphones which convert acoustic energy into audio data. Various cellular telephones further have processing and storage capability.

[00083] In certain embodiments, various existing PUA's are modified merely by software and/or minor hardware changes to carry out a research operation. In certain other embodiments, PUA's are redesigned and substantially reconstructed for this purpose. In certain embodiments the PUA is coupled with a separate research data gathering system and provides operations ancillary or complementary thereto.

[00084] In certain embodiments, the PUA itself is operative to gather research data. In certain embodiments, the PUA emits data that causes another device to gather research data. Such embodiments include various embodiments disclosed in US Patent No. 6,958,710 and in US patent application No. 11/084,481, referenced above. In certain embodiments, the PUA is

operative both to gather research data and to emit data that causes another device to gather research data.

[00085] Figure 1 is a block diagram of a PUA 20 (such as a cellular telephone or other data processing and communicating device) modified to carry out a research operation. The PUA 20 comprises a processor 30 that is operative to exercise overall control and to process audio and other data for transmission or reception and communications 40 coupled to the processor 30 and operative under the control of processor 30 to perform those functions required for establishing and maintaining a two-way wireless communication link with a PUA network. In certain embodiments, processor 30 also is operative to execute applications ancillary or unrelated to the conduct of PUA communications, such as applications serving to download audio and/or video data to be reproduced by PUA 20, e-mail clients and applications enabling the user to play games using the PUA 20. In certain embodiments, processor 30 comprises two or more processing devices, such as a first processing device (such as a digital signal processor) that processes audio, and a second processing device that exercises overall control over operation of the PUA 20. In certain embodiments, processor 30 employs a single processing device. In certain embodiments, some or all of the functions of processor 30 are implemented by hardwired circuitry.

[00086] PUA 20 further comprises storage 50 coupled with processor 30 and operative to store data as needed. In certain embodiments, storage 50 comprises a single storage device, while in others it comprises multiple storage devices. In certain embodiments, a single device implements certain functions of both processor 30 and storage 50.

[00087] In addition, PUA 20 comprises a microphone 60 coupled with processor 30 to transduce the user's voice to an electrical signal which it supplies to processor 30 for encoding, and a speaker and/or earphone 70 coupled with processor 30 to transduce received audio from processor 30 to an

acoustic output to be heard by the user. PUA 20 also includes a user input 80 coupled with processor 30, such as a keypad, to enter telephone numbers and other control data, as well as a display 90 coupled with processor 30 to provide data visually to the user under the control of processor 30.

[00088] In certain embodiments, the PUA 20 provides additional functions and/or comprises additional elements. In certain ones of such embodiments, the PUA 20 provides e-mail, text messaging and/or web access through its wireless communications capabilities, providing access to media and other content. For example, Internet access by the PUA 20 enables access to video and/or audio content that can be reproduced by the cellular telephone for the user, such as songs, video on demand, video clips and streaming media. In certain embodiments, storage 50 stores software providing audio and/or video downloading and reproducing functionality, such as iPod ® software, enabling the user to reproduce audio and/or video content downloaded from a source, such as a personal computer via communications 40 or through direct Internet access via communications 40.

[00089] To enable PUA 20 to gather research data, namely, data indicating exposure to audio such as programs, music and advertisements, in certain embodiments research software is installed in storage 50 to control processor 30 to gather such data and communicate it via communications 40 to a research organization. The research software in certain embodiments also controls processor 30 to store the data for subsequent communication.

[00090] In certain embodiments, the research software controls the processor 30 to decode ancillary codes in the transduced audio from microphone 60 using one or more of the known techniques identified hereinabove, and then to store and/or communicate the decoded data for use as research data indicating encoded audio to which the user was exposed. In certain embodiments, the research software controls the processor 30 to extract signatures from the transduced audio from microphone 60 using one or more of

the known techniques identified hereinabove, and then to store and/or communicate the extracted signature data for use as research data to be matched with reference signatures representing known audio to detect the audio to which the user was exposed. In certain embodiments, the research software both decodes ancillary codes in the transduced audio and extracts signatures therefrom for identifying the audio to which the user was exposed. In certain embodiments, the research software controls the processor 30 to store samples of the transduced audio, either in compressed or uncompressed form for subsequent processing either to decode ancillary codes therein or to extract signatures therefrom. In certain ones of these embodiments, the compressed or uncompressed audio is communicated to a remote processor for decoding and/or signature extraction.

[00091] Where the PUA 20 possesses functionality to download and/or reproduce presentation data, in certain embodiments, research data concerning the usage and/or exposure to such presentation data as well as audio data received acoustically by microphone 60, is gathered by PUA 20 in accordance with the technique illustrated by the functional block diagram of Figure 1A. Storage 50 of Figure 1 implements an audio buffer 54 for audio data gathered with the use of microphone 60. In certain ones of these embodiments storage 50 implements a buffer 56 for presentation data downloaded and/or reproduced by PUA 20 to which the user is exposed via speaker and/or earphone 70 or display 90, or by means of a device coupled with PUA 20 to receive the data therefrom to present it to a user. In some of such embodiments, the reproduced data is obtained from downloaded data, such as songs, web pages or audio/video data (e.g., movies, television programs, video clips). In some of such embodiments, the reproduced data is provided from a device such as a broadcast or satellite radio receiver of the PUA 20 (not shown for purposes of simplicity and clarity). In certain ones of these embodiments storage 50 implements a buffer 56 for metadata of presentation data reproduced by PUA 20 to which the user is exposed via speaker and/or earphone 70 or display 90, or by

means of a device coupled with PUA 20 to receive the data therefrom to present it to a user. Such metadata can be, for example, a URL from which the presentation data was obtained, channel tuning data, program identification data, an identification of a prerecorded file from which the data was reproduced, or any data that identifies and/or characterizes the presentation data, or a source thereof. Where buffer 56 stores audio data, buffers 54 and 56 store their audio data (either in the time domain or the frequency domain) independently of one another. Where buffer 56 stores metadata of audio data, buffer 54 stores its audio data (either in the time domain or the frequency domain) and buffer 56 stores its metadata, each independently of the other.

[00092] Processor 30 separately produces research data 58 from the contents of each of buffers 54 and 56 which it stores in storage 50. In certain ones of these embodiments, one or both of buffers 54 and 56 is/are implemented as circular buffers storing a predetermined amount of audio data representing a most recent time interval thereof as received by microphone 60 and/or reproduced by speaker and/or earphone 70, or downloaded by PUA 20 for reproduction by a different device coupled with PUA 20. Processor 30 extracts signatures and/or decodes ancillary codes in the buffered audio data to produce research data. Where metadata is received in buffer 56, in certain embodiments the metadata is used, in whole or in part, as research data 58, or processed to produce research data 58. The research data is thus gathered representing exposure to and/or usage of audio data by the user where audio data is received in acoustic form by the PUA 20 and where presentation data is received in non-acoustic form (for example, as a cellular telephone communication, as an electrical signal via a cable from a personal computer or other device, as a broadcast or satellite signal or otherwise).

[00093] In certain embodiments, the PUA 20 is provided with a research data source 96 coupled by a wired or wireless coupling with processor 30 for use in gathering further or alternative research data to be communicated to

a research organization. In certain ones of these embodiments, the research data source 96 comprises a location data producing device or function providing data indicating a location of the PUA 20. Various devices appropriate for use as source 96 include a satellite location signal receiver, a terrestrial location signal receiver, a wireless networking device that receives location data from a network, an inertial location monitoring device and a location data producing service provided by a PUA service provider. In certain embodiments, research data source 96 comprises a device or function for monitoring exposure to print media, for determining whether the user is at home or out of home, for monitoring exposure to products, exposure to displays (such as outdoor advertising), presence within or near commercial establishments, or for gathering research data (such as consumer attitude, preference or opinion data) through the administration of a survey to the user of the PUA 20. In certain embodiments, research data source 96 comprises one or more devices for receiving, sensing or detecting data useful in implementing one or more of the foregoing functions, other research data gathering functions and/or for producing data ancillary to functions of gathering, storing and/or communicating research data, such as data indicating whether the panelist has complied with predetermined rules governing the activity or an extent of such compliance. Such devices include, but are not limited to, motion detectors, accelerometers, temperature detectors, proximity detectors, satellite positioning signal receivers, RFID readers, RF receivers, wireless networking transceivers, wireless device coupling transceivers, pressure detectors, deformation detectors, electric field sensors, magnetic field sensors, optical sensors, electrodes, and the like.

[00094] Figure 1B is a block diagram of a system 100 for setting up, promoting, operating, maintaining and/or terminating research operations with the use of multiple cellular telephones or other PUA's having communications capabilities, such as that illustrated in Figure 1. For these purposes, the system 100 operates under the control of a processor 110 to communicate messages to the PUA 20, and receive communications therefrom, by means of

communications 120 coupled with processor 110 and with PUA 20. In certain embodiments, some messages are sent and received for conducting tests. In certain embodiments, communications 120 is coupled with PUA 20 via a cellular telephone network. In certain embodiments, communications 120 is coupled with PUA 20 via the Internet or other network via a host or device (e.g., a telephone terminal or connection) able to communicate via such a network coupled with PUA 20, such as a personal computer, or via a wireless link or cable coupling the PUA 20 with such a network so that the PUA 20 functions as a host or device communicating on the network.

[00095] Instructions for operating processor 110 as well as research data received by the system 100 are stored in storage 130 coupled with processor 110. An input device or devices 140 coupled with processor 110 enable a user of the system 100 to enter commands and/or data such as system commands (for example, a system startup command or a command to enter a system maintenance mode), research data and/or software updates or other modifications. In certain embodiments, some commands are sent for conducting tests. System 100 in certain embodiments is maintained by a research organization. In certain embodiments, system 100 is maintained by another entity acting for or on behalf such a research organization. The operation of system 100 in cooperation with PUA 20 to set up, promote, operate, maintain and/or terminate research operations, is further described hereinbelow.

[00096] In order to identify PUA users for random sampling to establish a panel of such users for gathering research data, in certain embodiments one or more lists of subscribers are obtained from PUA service providers and the users are contacted at random to recruit them to participate on the panel. In certain instances, publicly available records may be sufficient to identify the users. Public records include telephone number and address directories, e-mail directories, and various governmental filings, among other records. Other public and non-public information, such as warranty records (e.g.,

from completed warranty cards), and retail store records containing purchaser information, may be utilized. In certain other embodiments, the identities of the owners and/or users of the PUA's to be employed are not ascertainable and thus are obtained from the users themselves. In certain embodiments, combinations of the foregoing user identification methods are used.

[00097] In certain embodiments, PUA users are recruited through a communication using a means other than their PUA's, such as by mail, e-mail, a call to a landline telephone number or by personal contact, while in certain embodiments, a widely disseminated solicitation is used, such as an advertisement or notice in one or more types of media. In certain embodiments, PUA users are contacted by system 100 of Figure 2 or by other means via their PUA's, such as PUA 20, by supplying an appropriate communication which causes the PUA to provide a predetermined audible and/or visual message to the user providing a request for participation as a panel member. With reference again to Figure 1, in certain ones of such embodiments, the communication comprises a live, synthesized or recorded voice call to the PUA 20 either from system 100 or by other means, while in certain ones of such embodiments, the communication comprises a visual message from system 100 to PUA 20 and provided thereby to the user via display 90. Such a visual message may be an e-mail, a text message, a web page or the like. In certain ones of such embodiments, the PUA 20 is provided to the user with software operative to control the PUA to communicate the message in audible and/or visual form to the user, with or without receipt of an activation message in the PUA to initiate the communication of the audible and/or visual message to the user. In certain ones of such embodiments, the visual display message is operative to control the PUA 20 to display an interactive control enabling the user to communicate an acceptance of the request to participate in the panel to the system 100. Such control may be a form, an e-mail address, a telephone number or the like and in certain embodiments, requests demographic information of the user and/or

provides instructions for participating in a research operation by means of the user's cellular telephone.

[00098] In certain embodiments, multiple messages are communicated to users to recruit them. In certain ones of such embodiments, a first recruitment message is communicated containing data to indicate to the user that participants are being recruited and requesting the user to consider participating. Subsequently, a second recruitment message is communicated to the user containing data directly requesting the user's participation. In some implementations the first message is communicated by system 100 as an automatically generated message, while in others it is a widely disseminated message. In some implementations the first message contains data indicating that a benefit will be provided to the user for such participation or agreement to participate, as an incentive for the user to agree to participate. This gives the user an opportunity to consider the desirability of receiving the benefit before receiving the second message soliciting his/her participation, and thus serves as a pre-recruitment tool.

[00099] In order to encourage participation in such research operation, in certain embodiments the recruitment message provides or offers to provide a benefit to the user in exchange for the user's participation or agreement or willingness to participate in a research operation. In certain ones of such embodiments, the benefit is provided in response to a message from the user, via the PUA 20, indicating a willingness or agreement to participate in the research operation, and in certain cases a message is communicated by system 100 to PUA 20 indicating that the benefit is being provided, such as a cash benefit, a credit or a service, and a corresponding instruction for provision of the service is communicated by system 100 to an appropriate benefit provider. In certain ones of such embodiments, the offered benefit comprises a service provided by means of the PUA, such as voice, text message and/or e-mail communication services, other Internet services and/or access to certain

applications (e.g., games or personal information management software), content or media data (such as ring tones, images, audio/video data, or songs). In certain ones of such embodiments, the offered benefit comprises cash or a credit, or a service provided apart from the use of the PUA. In certain ones of such embodiments, an offer is made to provide a PUA comprising a research data gathering system and/or a service provided by means of a PUA for a person's use conditioned on the person's participation in the research operation. Activation of the PUA to provide services to the user can be conditioned on such participation. In certain ones of such embodiments, the recruitment message is communicated to the PUA with an offer to provide a service with the use of the PUA or to activate such a service, such as voice or other data communication services or access to content such as audio or video content. The provision of the service is initiated or the service is activated in certain ones of such embodiments by communicating a benefit provision message to at least one of the cellular telephone and a service provider.

[000100] In certain embodiments, the PUA 20 as provided to the user stores software enabling it to gather, store and/or communicate research data, such as codes and/or signatures indicating exposure to audio media. In certain ones of such embodiments, the software is inoperative to carry out at least one of such gathering, storing or communicating functions until activated, by an action of the user (such as a command to the PUA entered by the user input 80 of the microphone 60, or data entered by the user indicating agreement to participate in the research operation) and/or by means of a communication received by the PUA from system 100. In certain ones of such embodiments, the software is enabled when the PUA is provided to the user.

[000101] In certain embodiments, the PUA 20 as provided to the user, while capable of gathering, storing and/or communicating research data when appropriate software runs on its processor 30, lacks some or all of such appropriate software. In certain ones of such embodiments, the PUA 20 is

enabled to gather, store and/or communicate research data by downloading the required software from system 100. In certain ones of such embodiments, in response to a message expressing agreement to participate in a research data gathering, storage and/or communication activity or a different message from which such agreement can be inferred (such as a download request), the PUA 20 downloads the required software from system 100, as well as media data or other content (such as ring tones, images, audio/video data, or songs), games and/or other user software, provided as an incentive for such participation. The content and/or software can be sent from system 100 or from a different source. In certain ones of such embodiments, the user installs the software in the PUA 20 from external storage, such as a personal computer or external storage device, using a wireless communications link, a cable or an interface.

[000102] Various ways of responding to the recruitment message are provided in a variety of embodiments. In certain embodiments, the user responds to a recruitment message by communicating a message to system 100 or other destination in response via the PUA 20, either in the form of a voice call, a form containing the message, an e-mail, text message or the like, indicating a willingness or agreement to participate in the proposed research operation using the PUA. In certain embodiments, the responsive message is communicated by a different means, such as by a voice call using a different telephone, by mail, e-mail, a form provided by a web page, an in-person communication or the like. However the responsive message is communicated, in certain embodiments it includes demographic data and/or data that conveys other personal or household attributes to be stored in system 100. In certain embodiments, such data is communicated by a different message. In certain embodiments, a message is communicated from the PUA 20 in response to the recruitment message from which the user's willingness to participate can be inferred, such as a message to system 100 that conveys research data gathered by the PUA 20 where it is necessary for the user to activate its capability to gather, store and/or communicate research data or a message to system 100 requesting a download

of software or other data required to provide, activate or enable the cellular telephone's capabilities to gather, store and/or communicate research data.

[000103] Where the user responds to a widely disseminated solicitation, such as an advertisement, a notice, a documentary solicitation provided with the PUA or the like, the responsive message can be communicated as described hereinabove. In certain embodiments, a response to a widely disseminated solicitation takes a different form or includes different content, such as a request communicated to system 100 for download of software or other data required to initiate, install or activate the operation of the PUA to automatically gather, store and/or communicate research data, and/or a communication of research data from the PUA to system 100 from which the user's willingness to participate can be inferred.

[000104] In certain embodiments, the PUA activates, installs and/or enables functionality to gather, store and/or communicate research data in response to or conditioned upon, the user's affirmative response to the recruitment message. In certain ones of such embodiments, an action of the user to produce, enter or communicate such an affirmative response using the PUA 20 activates such functionality implemented by software running on processor 30. In certain ones of such embodiments, such action of the user causes PUA 20 to request a download of software and/or data for installing, activating or enabling such functionality. In certain ones of such embodiments, such action of the user causes PUA 20 to install software provided with the recruitment message to implement such functionality, or else to make use of other data in or accompanying the recruitment message to implement such functionality.

[000105] Where the user responds to a widely disseminated solicitation, such as an advertisement, a notice, a documentary solicitation provided with the PUA or the like, the responsive message can be communicated as described hereinabove. In certain embodiments, a response to a widely

disseminated solicitation takes a different form or includes different content, such as a request communicated to system 100 for download of software or other data required to initiate, install or activate the operation of the PUA to automatically gather, store and/or communicate research data, and/or a communication of research data from the PUA to system 100 from which the user's willingness to participate can be inferred.

[000106] Data indicating the recruitment of the user and indicating an identity of the PUA to be used in the research operation to gather, store and/or communicate research data by means of the PUA is stored in storage 130 of system 100 based on the responsive message. Research data gathered by means of such PUA is stored in association with data identifying the PUA.

[000107] It is desired to successfully recruit a substantial proportion of the users contacted. Where no response to a recruitment message is received or a response is received but indicates an unwillingness to participate, in certain embodiments negative data indicating a failure to recruit the user to participate in the research operation is stored in system 100 and subsequently a further recruitment message is communicated to the user to solicit participation in the research operation. The reason for failing to successfully recruit the user can be time-dependent. For example, the user might not have the PUA turned on during a time of day when the recruitment message is communicated, or the user might not be receptive to such a message at the time of day that the message is first sent. In certain ones of such embodiments, system 100 stores the time when the unsuccessful message was communicated and the further recruitment message is communicated under the control of system 100 at a time differing from the time at which the previous message was communicated. In certain ones of such embodiments, a content of a negative response from the user is employed as a basis for communicating the further recruitment message.

[000108] In certain embodiments, the recruitment message includes survey questions requesting the user to provide demographic or other data

concerning the user or the user's household. Where fewer than all of the survey questions are answered, in certain embodiments, a further message is communicated to the user including a survey having fewer questions than the previous, uncompleted survey. In certain ones of such embodiments, the number of survey questions of the first message that were answered is used by system 100 to determine the number of questions included in the subsequent message. For example, if the user only answered three of eight questions contained in the first message, the subsequent message might include three or fewer questions to improve the likelihood that all will be answered by the user in a responsive message.

[000109] In certain embodiments, a response to the recruitment message is communicated by the PUA with or without any action by the user. In certain ones of such embodiments, the response comprises a message from the PUA indicating an operational status or ability thereof to gather, store and/or communicate research data and/or a message from the PUA indicating receipt of the recruitment message.

[000110] Where it is necessary to activate a capability of the PUA to automatically carry out a research operation, in response to the message from the user indicating a willingness to participate, in certain embodiments an activation message is communicated by system 100 to the PUA with a command or request to effect such activation. In certain embodiments, the activation message includes activation data to activate such capability, with or without an accompanying activation command. In certain ones of such embodiments, the activation data comprises a telephone number, a network address (such as an IP address, domain name, MAC address, or the like), a communication protocol or other data useful for communicating the research data gathered by means of the PUA. In certain ones of such embodiments, the activation data comprises software for running on the processor 30 of the PUA 20 to control, carry out and/or enable a research operation thereby. In certain embodiments, the

activation message is communicated to the user, via PUA 20 or otherwise, by system 100 or by other means, and requests an action thereof to activate, enable and/or install a capability of the PUA to carry out a research operation and/or provides instructions for participating in a research operation automatically by means of the PUA 20.

[000111] In response to the message from the user indicating a willingness to participate, in certain embodiments a message is communicated by system 100 or by other means (for example, a live, synthesized or stored voice call, or in documentary form) to the user via the PUA or by other means providing instructions for participating in the research operation to gather, store and/or communicate research data automatically by means of the PUA. Where the user is offered an incentive to participate, such as cash, credit or a service, in certain embodiments, a message is communicated by system 100 in response to the message from the user to a provider of such incentive, such as a service provider, retailer or financial institution to instruct that the incentive be provided. In certain embodiments where the benefit comprises a service provided by means of the PUA, in response to the message from the user indicating a willingness to participate, system 100 communicates a message to the user and/or to the PUA enabling the PUA to provide the service or enabling the user to make use of the PUA to obtain the service. In certain ones of such embodiments, the service comprises a provision of media data or of content that is not widely available and a message is communicated by the system 100 or by a different source for such content in response to a message from system 100, to the PUA and/or the user comprising such media data or content and/or data enabling the user to access the media data or content by means of the PUA or otherwise.

[000112] In certain embodiments, an activation message is communicated to the PUA 20 by system 100 without regard to prior receipt of a participation message from the PUA or its user. In certain ones of such

embodiments, the activation message comprises a request to the PUA 20 for data indicating an operational status thereof to gather, store and/or communicate research data and/or system data for the PUA, such as an identification thereof and/or data concerning its operating system that enables selection of appropriate software to run on the processor 30 thereof, and in response the PUA communicates the requested data to the system 100. A response to this message in certain ones of these embodiments can be used to build a database of potential panelists from whom such panelists may be recruited at random. It can also be employed as a means of determining one or more appropriate times to contact the user with a recruitment message. In certain ones of such embodiments, the activation message communicated by system 100 comprises a request to the PUA 20 or its user for research data gathered automatically by the PUA. This is useful where, for example, the user has previously entered data in the PUA indicating a willingness to participate in such a research operation, but where such data has not been communicated from the PUA. In certain ones of such embodiments, the activation message from system 100 comprises a request to the PUA for a response comprising a receipt for the activation message. A request of this kind can be used to determine that the PUA is operational. This is useful, for example, to build a database of potential panelists to be contacted subsequently or where no further data concerning the PUA or its user is required. In certain ones of such embodiments, the activation message comprises a message communicated from system 100 to PUA 20 comprising activation request data for the PUA 20 requesting activation of a capability thereof to gather, store and/or communicate research data to system 100 or elsewhere, or else requesting an action of the user to activate such capability. In certain ones of such embodiments, the PUA 20 responds (with or without any prior action by the user to effect such activation) by communicating one or more messages to system 100 comprising research data gathered automatically by the PUA 20, indicating an operational status or ability thereof to gather, store and/or communicate research data, indicating receipt by PUA 20 of the activation

message and/or data from the user indicating a willingness or agreement to participate in the research operation.

[000113] With or without any prior communications between the system 100 and the PUA 20, the activation message in certain embodiments comprises instructions for participating in a research operation by means of the PUA 20. In certain ones of such embodiments, the PUA responds (with or without a prior action by the user that enables such response) by communicating a message to system 100 comprising at least one of research data gathered automatically by the PUA 20, a message from the PUA 20 indicating an operational status or ability thereof to gather, store and/or communicate research data, a message from the user of the PUA 20 concerning participation of the user in a research operation by means of the PUA, a message from the user of the PUA identifying such user and/or the PUA, and a message from the PUA indicating receipt thereby of the message from system 100. In some cases the message from PUA 20 to system 100 comprises data indicating a willingness or agreement of the user to participate in the research operation, which can be in the form of visual display data.

[000114] At the time of initiating the user's participation as a member of a panel, and/or from time to time, in certain embodiments a maintenance message is communicated by system 100 to the PUA 20 and/or a research data gathering system coupled therewith (as described herein below) for one or more purposes. In certain ones of such embodiments, a message is communicated by system 100 to the PUA 20 and/or the research data gathering system for testing its ability to gather, store and/or communicate research data as presently configured or as it may be configured using software and/or hardware to interact with the PUA's or the research data gathering system's pre-existing software and/or hardware. In certain embodiments, the message is communicated by a third party, such as a cellular telephone service provider. Such message comprises a test command to control a test operation of the PUA and/or the

research data gathering system, test data for use in conducting such a test operation, such as by processing the test data in the processor 30, and/or test software to run on processor 30 or a processor of the research data gathering system to control it to carry out a test operation, and which in some cases is stored in storage 50 for subsequent use. That is, the test data thus provided to the PUA and/or the research data gathering system serves to establish, enable or provide a capability thereof to test its ability to carry out a research operation. Accordingly, in certain embodiments, test software and/or test data is stored in the PUA 20 and/or the research data gathering system when it is acquired by the user, or stored therein at a subsequent time, such as a part of software downloaded to or otherwise stored in PUA 20, with or without an action of the user. In certain ones of such embodiments, the PUA 20 communicates a message to system 100 in response indicating receipt of the maintenance message. Data providing results of the test operation is communicated from the PUA 20 to system 100, in certain ones of such embodiments, directly from PUA 20 and/or from a third party service provider.

[000115] In certain embodiments, such a test is conducted in response to a predetermined event, such as the occurrence of an operational condition of the PUA and/or the research data gathering system indicating a desirability of testing its operational capabilities, or the occurrence of a predetermined time. In certain embodiments, such a test is conducted in response to receipt of a recruitment message, communication of a response to the recruitment message or a message requesting that a test be carried out, or at the time of installation, activation or enablement of functionality in PUA 20 to gather, store and/or communicate research data. In certain embodiments, such a test is carried out when the production of data indicates faulty operation or inoperative state. In certain embodiments, the test results are communicated to a processing facility.

[000116] In certain embodiments, the operation of a clock of the PUA 20 (not shown for purposes of simplicity and clarity) is tested to determine an offset in its clock rate from a standard. In certain ones of such embodiments, where the PUA implements a research data gathering operation with the use of a function for converting time-domain data (such as time-domain audio data) to frequency-domain data, the maintenance message from system 100 comprises time-domain test data having a predetermined frequency content, such as audio data having a single frequency component. The output of the function is data indicating a single frequency and any deviation of that single frequency from the predetermined frequency of the audio data will reveal any offset of the PUA's clock from the standard. The test results can be used either by system 100 or by PUA 20 to compensate for any such offset or else to disqualify the PUA for use in the research operation.

[000117] In certain embodiments, a maintenance message is communicated to the PUA 20 by system 100 requesting a response therefrom identifying the user. This is useful to confirm that the PUA is being used by the panelist/user or by another, such as another member of the panelist's household. In certain ones of such embodiments, the requested response comprises a voice message including identifying data, such as a screen name or other alias of the user that is known to system 100. In certain ones of such embodiments, the requested response is a voice signature gathered by software running on processor 30 or extracted from a responsive voice message from PUA 20 by processor 110 of system 100. In certain embodiments, the requested response comprises a text message, an e-mail or a response conveyed by means of a form.

[000118] In certain ones of such embodiments, the response is requested from the user by means of an audible or visual user identification request message and requires an action of the user before it is communicated. In certain ones of such embodiments, the requested response is communicated

by the PUA 20 automatically in response to a user identification request message and without the need for the user's participation. In some of such embodiments, the processor 30 runs software that automatically extracts a voiceprint for a current user of the PUA which is sent as the responsive message. In some of such embodiments, the user is asked or required to enter user identification data in the PUA 20 when turning on the cellular telephone, and/or from time to time, and the user identification data is stored by storage 50 pending receipt of a user identification request message. The PUA 20 responds to the user identification request message from system 100 by communicating the user identification data to system 100. In certain embodiments, PUA 20 stores current user identification data and communicates it to system 100 without the need for any message from system 100 requesting such identification data. Such communications are made in response to the occurrence of a condition, such as storage of current user identification data in storage 50, passage of time, occurrence of a predetermined time, application of power to the PUA, detection of movement of the PUA or use of the PUA.

[000119] In certain embodiments, data identifying the PUA 20 and the user is communicated from the PUA 20 or otherwise by the user and is stored by system 100 in storage 130 prior to communicating the maintenance message to enable a determination that the user of the PUA is the panelist. When the response to the maintenance message is communicated by the PUA 20 and received by system 100, it is compared with the previously stored data to determine the user's identity.

[000120] In certain embodiments, a maintenance message is communicated by system 100 to the PUA 20 requesting demographic or other user-specific data or household data. This is useful to update such information from time to time, or to follow up an initial request for such information that did not prompt a complete response. In certain ones of such embodiments, then, a prior message is communicated from the PUA or otherwise from the user to

system 100 to convey demographic or other user-specific data or household data to be stored in storage 130.

[000121] In certain embodiments, the maintenance message communicated by system 100 comprises a request for system data concerning the PUA 20. Such data is useful, for example, to determine whether research data software running in the PUA needs to be updated and, if so, which updates to provide. It is useful also to determine whether the functions and/or capabilities of the PUA 20 have changed, such as by installation of software from a third party, or whether the PUA 20 has been replaced by the user. In certain ones of such embodiments, the system data is requested from the user, while in others the system data is requested directly from the PUA 20 by system 100 without the need to involve the user.

[000122] In certain embodiments, the maintenance message comprises a command or request communicated by system 100 for the PUA to carry out a research operation. This is useful where, for example, it is desired to modify the type, quality or extent of the research data gathered or stored by means of the PUA, or else to reactivate a data gathering, storage and/or communication function of the PUA that had previously been disabled or otherwise been made unavailable (for example, where a modification of its software disabled such function or the PUA had been replaced with a new PUA). It is also useful for managing communications of research data from the PUA, so that they occur at times or under conditions determined by system 100, or else to provide an address for communicating such data. In certain ones of such embodiments, the PUA responds to the maintenance message by communicating research data to system 100 and/or by communicating an acknowledgement to system 100 that it has received the maintenance message and/or carried out a requested operation. In certain ones of such embodiments, the system 100 stores data identifying the PUA 20 and its user/panelist before communicating the maintenance message. In certain ones of such

embodiments, the PUA responds to the maintenance message by communicating a message to system 100 indicating an ability and/or availability thereof to carry out a research operation.

[000123] When a user's participation in the panel is terminated, in certain embodiments a termination message is communicated by system 100 to the user's PUA for one or more purposes. In certain embodiments, the PUA 20 responds by communicating a message to system 100 indicating that it has received the termination message. In certain ones of such embodiments, the termination message comprises a deactivation message to the PUA 20 to deactivate a research operation or an ability to carry it out, either automatically without any action of the user, or else instructing the user to deactivate such function. Of these embodiments, in certain ones the termination message also comprises data for producing a message to the user, conveyed either visually or audibly, notifying the user than such research operation has been deactivated. Of these embodiments, if the research operation is deactivated, in certain ones the PUA 20 subsequently communicates a responsive message to the system 100 to indicate that the research operation has been deactivated. Of these embodiments, in certain cases, the deactivation message deactivates one data gathering, storage and/or communication function, but permits another to continue in operation while providing a control to the user enabling the user to deactivate the function that continues in operation, and in certain ones of these embodiments, the provision of the control is conditioned on deactivation of the one function by the user and/or receipt of the deactivation message in the PUA. Where the termination message comprises a deactivation message directed to the user, and the user is promised a credit or other benefit as an incentive, in certain cases the provision of the credit or other benefit is conditioned on deactivation of the one function by the user.

[000124] In response to such a deactivation message, in certain embodiments the PUA 20 communicates a message to system 100 reporting that

the function has been deactivated and/or a message acknowledging receipt of the deactivation message. In response to such a deactivation message, in certain embodiments, the user inputs a deactivation command in the PUA 20 instructing it to deactivate a capability thereof to gather, store and/or communicate research data.

[000125] In certain embodiments where the user is promised a credit or other benefit for participation as an incentive, the termination message comprises a message communicated by system 100 to a third party credit facility or other benefit provider instructing that a final benefit be provided to the user. In certain ones of these embodiments, a corresponding notice is communicated by system 100 to the user, via the PUA 20 or otherwise.

[000126] Figure 2 illustrates PUA 20 coupled by its communications 40 with communications 210 of a research system 200 comprising a microphone 220, a processor 230 coupled with microphone 220 and with communications 210 by a wired or wireless link. Research system 200 in certain embodiments comprises storage 240 coupled with processor 230. In certain embodiments, communications 40 is operative to communicate data to a research data processing facility. In certain embodiments, communications 40 is further operative to communicate data with the research system 200. Such communications between the PUA 20 and research system 200 may be triggered by, for example, either (1) the elapse of a predetermined interval of time, (2) production of a communications request or query by either the PUA 20 or the research system 200, (3) the storage of a predetermined amount of data by either PUA 20 and/or research system 200, (4) proximity of PUA 20 and the research system 200, or (5) any combination of (1) – (4). In certain embodiments, communications 40 of PUA 20 comprises a transceiver configured to communicate using a Bluetooth protocol, ZigBee ™ protocol, wireless LAN protocol, or via an infrared data link, inductive link or the like, for enabling communications with the research system 200 as well as with a network, network

host or other device to communicate data to a research data processing facility. In certain embodiments, communications 40 of PUA 20 comprises a first transceiver configured to communicate with research system 20 and a second transceiver (such as a cellular telephone transceiver) configured to communicate with the research data processing facility.

[000127] In certain embodiments research system 200 is housed separately from PUA 20 and is physically separated therefrom, but both are carried on the person of a panelist. In certain embodiments, research system 200 is housed separately from PUA 20 but is either (1) affixed to an exterior surface thereof, (2) carried by or in a common container or carriage device with PUA 20, (3) carried by or in a cover of PUA 20 (such as a decorative "skin"), or (4) arranged to contain PUA 20. In certain embodiments, PUA 20 and research system 200 are contained by a common housing.

[000128] In certain ones of such embodiments, processor 230 of research system 200 serves to read ancillary codes and/or extract signatures from audio data transduced by the microphone 220. Certain ones of these embodiments communicate the ancillary codes that have been read and/or the signatures that have been extracted to the PUA 20 by communications 210 for storage and/or communication from the PUA.

[000129] In certain ones of these embodiments, storage 240 serves to store the ancillary codes and/or signatures for subsequent communication to the PUA 20.

[000130] In certain ones of such embodiments, research system 200 serves to store audio data transduced by the microphone 220 in storage 240, and subsequently communicates the audio data to PUA 20 via communications 210. PUA 20 processes the audio data as described hereinabove to produce research data therefrom.

[000131] In certain ones of such embodiments, research system 200 receives audio data from PUA 20 via communications 210 and processor 230 serves to produce research data from the audio data which either is stored in storage 240 and subsequently communicated to PUA 20 by communications 210 or communicated thereby without prior storage in research system 200.

[000132] In certain ones of such embodiments, processor 230 of research system 200 receives presentation data and/or metadata of the presentation data from PUA 20 via communications 210 and processes the presentation data and/or metadata to produce research data therefrom. Such presentation data and metadata is received by PUA 20 in a form other than acoustic data such as electrical or electromagnetic data. Research system 200 either stores such research data in storage 240 and subsequently communicates it to PUA 20 by communications 210, or communicates the research data to PUA 20 by communications 210 without prior storage in research system 200.

[000133] In certain embodiments of research system 200, processor 230 adds a time and/or date stamp to research data, media data, presentation data or metadata of one of the foregoing received, produced, stored or communicated thereby.

[000134] In certain ones of such embodiments, research system 200 receives audio data, presentation data and/or metadata of one of the foregoing from PUA 20 via communications 210 and stores the received data in storage 240. Subsequently, system 200 reads the stored data from storage 240 and communicates it to PUA 20 which either processes it to produce research data therefrom or communicates it to a processing facility for producing research data. Communication of the research data from the PUA 20 affords a number of advantages. At least a first advantage includes being able to provide a user a research system of smaller size and lower weight since (1) it need not itself comprise hardware enabling communication of the research data to the processing facility, (2) a smaller power source, commonly a battery, thus

decreasing the size and weight of the research system may be used for operation thereof, and (3) less data storage capacity is necessary in the research system given the opportunity for frequent communication of research data between the PUA 20 and the research system 200. At least a second advantage includes an opportunity for increased frequency of reporting of the research data to the research data processing facility since the PUA 20 is readily available for the communication thereof.

[000135] In certain ones of the foregoing embodiments, PUA 20 gathers media data research data from media data received thereby in non-acoustic form and/or metadata of such media data. PUA 20 either stores such media data research data and later communicates it to a research organization via communications 40, or communicates it without first storing it. In certain ones of such embodiments, PUA 20 receives audio data research data from system 200 produced thereby from audio data, and communicates the audio data research data to a research organization via communications 40. In certain ones of such embodiments, PUA 20 combines the audio data research data and the media data research data for communication to a research organization via communications 40.

[000136] Figure 2A illustrates a research data monitor 72 affixed to an outer surface 21 of a PUA 20A, wherein the monitor 72 is operative in certain embodiments to gather research data and communicate it to PUA 20A which in turn communicates the research data to the system 100 of Figure 1B. PUA 20A is illustrated in the block diagram of Figure 2B. In certain embodiments, monitor 72 implements one or more of the research operations described above in connection with Figure 2. As shown in Figure 2B, PUA 20A comprises the same elements as PUA 20 of Figure 1, except that research data source 96 is omitted from the embodiment of Figure 2B.

[000137] Research data monitor 72 is illustrated in the block diagram of Figure 2C. The research data monitor 72 comprises a processor 74 that is

operative to exercise overall control of the monitor 72 and to process data for transmission or reception and communications 82 coupled to the processor 74 and operative under the control of processor 74 to perform those functions required for conducting communications with PUA 20A. In certain embodiments, processor 74 comprises two or more processing devices, such as a first processing device (such as a digital signal processor) that processes research data, such as audio data, and a second processing device that exercises overall control over operation of the monitor 72. In certain embodiments, processor 74 employs a single processing device. In certain embodiments, some or all of the functions of processor 74 are implemented by software, while in other embodiments, the functions of processor 74 are implemented in hardwired circuitry without the use of software.

[000138] In certain embodiments, communications 82 establishes and maintains a wireless communication link with communications 40 of PUA 20A, using a Bluetooth ™ protocol, a ZigBee ™ protocol, an inductive link, a capacitive link, an RF link, infrared link, or otherwise. In certain embodiments, communications 82 communicates with communications 40 using a wired link, such as a USB interface, a Firewire® interface, a connection to a plug or jack of the PUA 20A or an internal connection to PUA 20A.

[000139] Research data monitor 72 further comprises a research data source 76 coupled with processor 74. In certain embodiments, research data monitor 72 comprises a microphone that serves to transduce acoustic energy for processing by processor 74 to produce research data. In certain embodiments, research data source 76 comprises a keypad that enables the user to input data, such as channel or station data, user identification data or another kind of research data. In certain embodiments, monitor 72 comprises an RF receiver and/or infrared radiation detector. In certain embodiments, monitor 72 comprises a location data producing device or function providing data indicating a location of the monitor 72. Various devices appropriate for use as research data source

76 include a satellite location signal receiver, a terrestrial location signal receiver, a wireless networking device that receives location data from a network, an inertial location monitoring device and a location data producing service provided by a PUA service provider. In certain embodiments, monitor 76 comprises a device or function for monitoring exposure to print media, for determining whether the user is at home or out of home, for monitoring exposure to products, exposure to displays (such as outdoor advertising), presence within or near commercial establishments, or for gathering research data (such as consumer attitude, preference or opinion data) through the administration of a survey to the user of the PUA 20A. In certain embodiments, monitor 76 comprises one or more devices for receiving, sensing or detecting data useful in implementing one or more of the foregoing functions, other research data gathering functions and/or for producing data ancillary to functions of gathering, storing and/or communicating research data, such as data indicating whether the panelist has complied with predetermined rules governing the activity or an extent of such compliance. Such devices include, but are not limited to, motion detectors, accelerometers, temperature detectors, proximity detectors, satellite positioning signal receivers, RFID readers, RF receivers, wireless networking transceivers, wireless device coupling transceivers, pressure detectors, deformation detectors, electric field sensors, magnetic field sensors, optical sensors, electrodes, and the like.

[000140] Monitor 72 further comprises storage 78 coupled with processor 74 and operative to store data as needed. In certain embodiments, storage 78 comprises a single storage device, while in others it comprises multiple storage devices. In certain embodiments, a single device implements certain functions of both processor 74 and storage 78.

[000141] Figure 2D illustrates an embodiment of research data monitor 72 fabricated on a substrate 83, such as a printed circuit board or a flexible substrate comprising paper, plastic or the like, on which certain elements

of monitor 72 are printed on substrate 83. Power source 86 comprises a battery (either rechargeable or non-rechargeable) or a charge storage device such as a capacitor, printed on substrate 83. In the embodiment of Figure 2D, communications 82 comprises an RF transceiver, such as a Bluetooth ™ transceiver, a ZigBee ™ transceiver or other RF transceiver. An antenna 92 is printed on substrate 83 and coupled with communications 82. It will be appreciated that monitor 72 can be fabricated to have a very thin profile and very low weight, so that it may be affixed to the enclosure of a cellular telephone, a PDA or other PUA that is carried on the person of a participant, without adding substantially to its size or weight. In certain embodiments, the monitor 72 is carried by a cover for the PUA (such as a decorative "skin"). In certain embodiments, monitor 72 is housed in or carried by a device separate from the PUA and adapted to be carried with the person of a panelist who carries the PUA.

[000142] Figure 2E is a block diagram of a PUA comprising a personal communication device adapted to be carried on the person of a participant (such as a PDA, Blackberry ® device, pager, notebook computer, walkie talkie, or the like) having a processor 94, and communications 95, user data source 96 and storage 97 coupled with processor 94. A research data gathering device 72, adapted to be carried on the person of a participant, is operative to gather research data and communicate the same wirelessly to communications 95 of the personal communication device for subsequent communication by the personal communication device to a research data processing facility. In certain embodiments, the research data gathering device 72 is separate from the personal communication device, so that it is carried by the participant separately therefrom. In certain ones of such embodiments, the device 72 is contained in a PUA such as an article of jewelry, an article of clothing, a fob, a wristwatch or other PUA. In certain ones of such embodiments, the device 72 is contained in its own enclosure and is carried on a lanyard to be

worn about the participant's neck or provided with a pin, clasp or belt clip for attachment to an article of the participant's clothing.

[000143] Figure 3 is a block diagram of a personal digital assistant (PDA) 300 modified to gather research data. The PDA comprises a processor 310 that is operative to exercise overall control and to process data for, among other purposes, transmission or reception by the PDA and communications 320 coupled to the processor 310 and operative under the control of processor 310 to perform those functions required for establishing and maintaining two-way communications over a network (not shown for purposes of simplicity and clarity).

[000144] In certain embodiments, processor 310 comprises two or more processing devices, such as a first processing device that exercises overall control over operation of the PDA 300 and a second processing device that performs certain more specific operations such as digital signal processing. In certain embodiments, processor 310 employs a single processing device. In certain embodiments, some or all of the functions of processor 310 are implemented by hardwired circuitry.

[000145] PDA 300 further comprises storage 330 coupled with processor 310 and operative to store software that runs on processor 310, as well as temporary data as needed. In certain embodiments, storage 330 comprises a single storage device, while in others it comprises multiple storage devices. In certain embodiments, a single device implements certain functions of both processor 310 and storage 330.

[000146] PDA 300 also includes a user input 340 coupled with processor 310, such as a keypad, to enter commands and data, as well as a display 350 coupled with processor 310 to provide data visually to the user under the control of processor 310.

[000147] In certain embodiments, the PDA 300 provides additional functions and/or comprises additional elements. In certain embodiments, PDA 300 provides cellular telephone functionality, and comprises a microphone 370, as well as an ability of communications 320 to communicate wirelessly with a cell of a cellular telephone network, to enable its operation as a cellular telephone. Where PDA 300 possesses cellular telephone functionality, in certain embodiments PDA 300 is employed to gather, store and/or communicate research data, such as by storing appropriate research software in storage 330 to run on processor 310 and communicating with system 100 to set up, promote, operate, maintain and/or terminate a research operation using PDA 300..

[000148] In certain embodiments, communications 320 of PDA 300 provides wireless communications via Bluetooth protocol, ZigBee ™protocol, wireless LAN protocol, infrared data link, inductive link or the like, to a network, network host or other device, and/or through a cable to such a network, network host or other device. In such embodiments, PDA 300 is employed to gather, store and/or communicate research data, such as by storing appropriate research software in storage 330 to run on processor 310 and communicating with system 100 (either through a wireless link or through a connection, such as a cable) to set up, promote, operate, maintain and/or terminate a research operation using PDA 300.

[000149] In certain embodiments, the PDA is provided with a research data source 360 coupled by a wired or wireless coupling with processor 310 for use in gathering further or alternative research data to be communicated to a research organization. In certain ones of these embodiments, the research data source 360 comprises a location data producing device or function providing data indicating a location of the PDA 300. Various devices appropriate for use as source 360 include a satellite location signal receiver, a terrestrial location signal receiver, a wireless networking device that receives location data from a network, an inertial location monitoring device and a location data producing service

provided by a cellular telephone service provider. In certain ones of these embodiments, research data source 360 comprises a device or function for monitoring exposure to print media, for determining whether the user is at home or out of home, for monitoring exposure to products, exposure to displays (such as outdoor advertising), presence within or near commercial establishments, or for gathering research data (such as consumer attitude, preference or opinion data) through the administration of a survey to the user of the PDA 300. In certain ones of these embodiments, research data source 360 comprises one or more devices for receiving, sensing or detecting data useful in implementing one or more of the foregoing functions, other research data gathering functions and/or for producing data ancillary to functions of gathering, storing and/or communicating research data, such as data indicating whether the panelist has complied with predetermined rules governing the activity or an extent of such compliance. Such devices include, but are not limited to, motion detectors, accelerometers, temperature detectors, proximity detectors, satellite positioning signal receivers, RFID readers, RF receivers, wireless networking transceivers, wireless device coupling transceivers, pressure detectors, deformation detectors, electric field sensors, magnetic field sensors, optical sensors, electrodes, and the like.

[000150] In addition, PDA 300 comprises a microphone 370 coupled with processor 310 to transduce the user's voice to an electrical signal which it supplies to processor 310 for encoding, and a speaker and/or earphone 380 coupled with processor 310 to transduce received audio from processor 310 to an acoustic output to be heard by the user. PDA 300 also includes a user input 340 coupled with processor 310, such as a keypad, to enter telephone numbers and other control data, as well as a display 350 coupled with processor 310 to provide data visually to the user under the control of processor 310.

~~[000151]~~ In addition, PDA 300 comprises a personal communication device adapted to be carried on the person of a participant having a processor

310, and communications 320, and storage 330 coupled with processor 310. A research data source 360, adapted to be carried on the person of a participant, is operative to gather research data and communicate the same wirelessly to communications 320 of the personal communication device for subsequent communication by the personal communication device to a research data processing facility. In certain embodiments, research data source 360 comprises a microphone for receiving ambient acoustic energy and producing a corresponding electrical signal that is processed either by research data source 360 to read ancillary codes therein or extract signatures therefrom, or is instead processed for doing so by processor 310. In certain embodiments, the research data source 360 is separate from the personal communication device, so that it is carried by the participant separately therefrom. In certain ones of such embodiments, the research data source 360 is contained in a PUA such as an article of jewelry, an article of clothing, a fob, a wristwatch or other PUA. In certain ones of such embodiments, the research data source 360 is contained in its own enclosure and is carried on a lanyard to be worn about the participant's neck or provided with a pin, clasp or belt clip for attachment to an article of the participant's clothing.

[000152] Figure 4 is a block diagram of an external storage device 400, such as a portable storage drive, modified to gather research data. A storage 430, such as a flash memory, serves to store data for use by the user as well as research data. Access to storage 430 is controlled by a processor 410. In certain embodiments, storage 430 is partitioned into a portion used to store user data and a further portion used to store research data (as well as research software, if necessary, to run on processor 410). In certain embodiments, processor 410 dynamically partitions storage 430 into sections as needed so that each stores either user data or research data (and/or research software). Storage device 400 also comprises communications 420 coupled with processor 410 to receive data to be written in storage 430 and to communicate data read from storage 430. Communications 420 in certain embodiments communicates

data by means of a connection, such as a USB interface, while in others communicates its data wirelessly, for example, by means of a Bluetooth protocol, wireless LAN protocol, infrared data link, inductive link or the like.

[000153] Storage device 400 also comprises a research data source 440 that provides research data to be stored in storage 430 and communicated to system 100 via communications 420. In certain embodiments, research data source 430 comprises an acoustic transducer, such as a microphone, and processing (not shown for purposes of simplicity and clarity) to produce audio data in compressed or uncompressed form to be stored in storage 430 under the control of processor 410. In certain embodiments, ancillary codes in the audio data are decoded by processing in research data source 440 and/or signatures are extracted from the audio data thereby to be stored in storage 430. In certain embodiments other or additional types of research data are gathered by source 440, such as those described hereinabove.

[000154] In certain embodiments, storage device 400 employs external power to write and read user data via communications 420, as in the case of a USB interface. In such embodiments, research data source 440 includes a power source (not shown for purposes of simplicity and clarity), such as a rechargeable battery, to provide power for operating research data source 440 and writing research data to the storage 430 while storage device 400 is not coupled to a source of external power.

[000155] In certain embodiments, communications between storage device 400 and system 100 of the kind described above in connection with PUA 20, are conducted without involving the user, so that a user input and display are not required. In certain embodiments, such communications are carried out by coupling storage device 400 with a networked host, such as a personal computer, cellular telephone or PDA to communicate with system 100. Of these embodiments, in some cases a user input and display of the networked host are used to carry out communications involving user interaction. In these cases,

benefits for participating in a research operation to gather, store and/or communicate research data that require the user to carry the storage device 400 on his or her person, can be provided via the networked host or otherwise.

[000156] Figure 5 illustrates a pen 500 in phantom lines. A research data collection system 510 is contained within pen 500 and serves to gather research data of audio data to which a user carrying the pen is exposed. Figure 6 is a block diagram of research data collection system 510.

[000157] With reference both to Figures 5 and 6, the research data collection system 510 includes a research data source 520 and a processor 530. The research data source 520 is coupled with processor 530 to provide research data therefrom or data from which research data may be produced. In certain embodiments, research data source 520 comprises a microphone operative to transduce acoustic energy to which a user of the pen 500 is exposed while carrying the pen to produce audio data. In such embodiments, processor 530 either stores the audio data or a compressed version thereof as research data in a storage 540 of the system 510 coupled with the processor 530, or extracts research data therefrom, such as data represented by an ancillary code of the audio data and/or a signature of the audio data which it stores in storage 540.

[000158] In certain embodiments, processor 530 comprises two or more processing devices, such as a first processing device that exercises overall control over operation of the system 510 and a second processing device that performs certain more specific operations such as digital signal processing. In certain embodiments, processor 530 employs a single processing device. In certain embodiments, some or all of the functions of processor 530 are implemented by hardwired circuitry. In certain embodiments, storage 540 comprises a single storage device, while in others it comprises multiple storage devices. In certain embodiments, a single device implements certain functions of both processor 530 and storage 540.

[000159] System 510 of pen 500 also includes communications 550 coupled with processor 530 to communicate stored research data to system 100 of Figure 1B, as well as to receive communications therefrom and communicate other types of communications thereto of the kind described hereinabove for setting up, promoting, operating, maintaining and/or terminating a research operation with the use of the pen 500. In certain embodiments, communications 550 serves to establish a wireless communications link with a host or device on a network to conduct such communications, while in certain embodiments, system 510 serves as a host or device on a network for conducting such communications. In certain embodiments, communications 550 communicates with system 100 via a separate PUA having the ability to communicate with system 100. In certain ones of such embodiments communications 550 establishes a wireless link with the separate PUA according to a Bluetooth ™ or ZigBee ™ communications standard.

[000160] System 510 of pen 500 further includes compliance detection 560 that operates to detect data useful in determining whether the user is in compliance with rules governing the research operation. In certain embodiments, compliance detection 560 comprises a motion detector, a temperature sensor and/or a proximity detector and is coupled with processor 530 to provide its data thereto. Processor 530 processes such data to determine whether the pen is being carried by the user at prescribed times. System 510 also includes a compliance indicator 570 coupled with processor 530 which processor 530 controls to provide to the user an indication whether the user is in compliance with rules for the research operation concerning carriage of the pen. In certain embodiments, the indicator 570 comprises a light, such as an LED, that provides a visual indication of compliance or non-compliance under the control of processor 530. In certain embodiments, the indicator 570 comprises an audio transducer that produces sound under the control of processor 530 to indicate such compliance or non-compliance. Additional disclosures of compliance determination and indication techniques suitable for use in the various

embodiments disclosed herein are provided by US Patent No. 5,483,276 to Brooks, et al., assigned to the assignee of the present application and incorporated herein by reference in its entirety.

[000161] In certain embodiments, system 510 is powered by a rechargeable battery (not shown for purposes of simplicity and clarity). In such embodiments, recharging terminals 580 are provided for connecting system 510 to an external source of power for recharging such battery. In certain ones of such embodiments, the pen 510 is placed in a cradle of a base station (not shown for purposes of simplicity and clarity) where the terminals 580 contact terminals of the base station where recharging power is supplied. Appropriate base stations for this purpose are disclosed in US Patent No. 5,483,276, referenced above.

[000162] Figure 7A illustrates an exemplary table of a relational database storing data associating individual PUA users with a group of persons receiving communication services pursuant to a single agreement with a communication service provider. The relational database is stored in storage 130 of Figure 2 under the control of processor 110. Processor 110 stores data identifying each of a plurality of PUA users in the table of Figure 7A to associate such data with data 700 identifying a group agreement governing the provision of communication services to a group of persons. For example, the group agreement may comprise a family plan with a cellular telephone service provider. The exemplary table of Figure 7A associates data identifying four individual users (USER #3456. USER #3457, USER #3458, and USER #3459) with a particular group agreement 700. In certain embodiments, the association of data indicates which particular user in the group is using a particular PUA. In certain embodiments, the data identifying the PUA user comprises a screen name adopted by the PUA user.

[000163] Figure 7B illustrates a further exemplary table of the relational database of Figure 7A that stores data associating demographic data

of the four PUA users with data identifying with each respective user, that is, 3456, 3457, 3458 and 3459. Processor 110 stores data in the table of Figure 7B to associate demographic data of the PUA user with the data identifying the PUA user. For example, user #3456 corresponds to demographic data 710 which identifies the user as a female of age 40. Likewise, user #3457 corresponds to demographic data 720, user #3458 corresponds to demographic data 730, and user #3459 corresponds to demographic data 740. The demographic data may comprise information relating to sex, age, occupation, salary, etc. In certain embodiments, the association of data may indicate the demographic data of the particular user of the particular PUA.

[000164] In certain embodiments, a message is communicated from system 100 of Figure 2 to each respective PUA user requesting the demographic data of such user and a message containing the demographic data is received by system 100 from the respective PUA user in response. In certain ones of such embodiments, such messages are communicated to and from the user's PUA. In certain ones of these embodiments, a message is communicated to the respective PUA user in response to a message from the PUA user indicating an interest in participating in the research operation.

[000165] Still further embodiments are disclosed hereinbelow in connection with Figure 9, where in certain embodiments multiple different types of PUA's are employed in one or more research data collection activities and/or panels, under the control of one or more managing processors.

[000166] For purposes of convenience, the functionality of a PUA that enables a research operation is referred to herein sometimes as a "secondary function" of the PUA. As understand herein, a PUA's "primary function" is the function for which the PUA was purchased, leased, used or obtained by the user. The primary function of a PUA may be complex or simple.

[000167] The managing processor 600 supplies a communication, via a suitable communication network, to each PUA 610 that is selected and capable of implementing a designated secondary function. This communication is shown schematically as "Communication A" in Figure 9. Each receiving PUA 610 responds to Communication A to supply, either audibly or visually, an inquiry to the PUA user asking the PUA user if he/she would like to participate in a research operation as a panelist. Various forms of visual communications are possible, including text messages, graphic messages, e-mails, etc. An audible message may also be employed for various types of PUA's. For example, for a PUA that comprises a CD player, a personal audio player or similar device, and which is capable of receiving external communications, in certain embodiments the PUA responds to Communication A to provide an audible message to the user (e.g., via attached headphones). Text messages or e-mails, *inter alia*, are appropriate for PDA's, notebook computers and the like.

[000168] PUA users are provided an opportunity to respond to Communication A and may respond by accepting the offer to participate in the research operation, by declining the offer, or by not responding to the offer. In certain instances, a request for more information may be provided and/or an opportunity to defer the response, such as "ask me again tomorrow." The PUA user's response is represented as Communication B in Figure 9. If the user accepts the offer to participate, then the managing processor 600 includes the user as a panel member.

[000169] In certain embodiments, incentives to participate are offered. Various incentives, depending on the embodiment, include benefits related to use of the PUA, such as PUA-supplied services, award points or credits (e.g., free cellular telephone use, free play time for a game device PUA). Certain incentives do not relate to use of the PUA, such as award points or award dollars applicable for use or purchases at retail stores, Internet sites and other locations.

Other incentives include free software or unique content available only to panelists.

[000170] In certain embodiments employing incentives, benefits accrue during the period in which a PUA user remains a panel member. In other embodiments, benefits accrue during periods of time the PUA gathers research data, thus encouraging use and/or carrying around of the PUA. In further embodiments, benefits accrue when research data is received by the managing processor 600.

[000171] After a PUA user's acceptance to participate in a research panel (via Communication B), managing processor 600 supplies a communication that "initializes" the PUA or requests an action of the user to do so. This communication is represented as Communication C in Figure 9.

[000172] For those embodiments mentioned herein in which the PUA has the capability, without further modification, to implement a designated secondary function, initialization entails instructing or otherwise controlling the PUA to implement the secondary function or requesting that the user do so. For example, for particular cellular telephone PUA's that are capable of converting acoustic energy into audio data, storing that data and later supplying that data to a called or calling party, the cellular telephone is instructed to gather the audio data and to supply periodically the gathered audio data or research data derived therefrom or concerning such audio data to managing processor 600. Where it receives audio data, the managing processor 600 in turn extracts from the audio data relevant identification information to ascertain the particular media (e.g., station, channel, song, television/radio program, commercial, etc.) to which the PUA user was exposed.

[000173] As another example, a PDA capable of emitting a suitable identification signal is "initiated" to cause the PDA to periodically emit the identification signal (e.g., once per minute) during a research operation that

seeks to gather data relating to consumer exposure to billboards. In this example, various billboards are equipped with electronic devices that receive the emitted identification signals. Hence, the PDA is controlled to carry out a secondary function that enables the implementation of a technique described in US Patent No. 6,958,710, referenced above.

[000174] In certain embodiments, the manufacturer of the PUA pre-installs and/or equips the PUA with appropriate software and/or hardware to carry out one or more particular secondary functions. In certain other embodiments, the manufactured PUA is later adapted (e.g., by another entity) to enable it to carry out a secondary function. Other entities include retailers, wholesalers, research data gathering entities, service provides and other parties. In yet other embodiments, software is downloaded to the PUA to enable it to carry out a secondary function prior to inviting the PUA user to participate in the research panel.

[000175] For those embodiments mentioned herein in which the PUA is modifiable to implement a secondary function, then PUA initialization (in response to Communication C) entails, in certain embodiments, downloading software to the PUA during recruitment of a panel member to enable the recruited panel member's PUA to carry out the secondary function. For example, a cellular telephone may be programmable to decode information conveyed by an ancillary code in audio data (as set forth in various patents and applications referenced above) and then to supply the extracted information to managing processor 600. Initialization of such a PUA in certain embodiments entails downloading and installing suitable software and then executing that software to implement the secondary function.

[000176] As another example, a notebook computer having the capability to receive wireless transmissions, such as by means of a wireless network card, a Bluetooth transceiver or the like, is programmed during initialization to periodically ascertain its current location (and thus the location of

the PUA user) based on data received from the wireless network and to compare the ascertained location with a plural number of locations of interest that have been downloaded and stored within the notebook computer's storage. Each of the downloaded locations of interest may be a geographic location of a billboard, a retail store or other venue about which research data is being gathered. During implementation of this secondary function, the notebook computer ascertains when the PUA user is in the vicinity of (e.g., able to see) one of the stored venues of interest, and creates a record of the activity and later transmits to the managing processor the created records. This process and variations thereof are disclosed in US Published Patent Application 2006/0243784, referenced above.

[000177] For those embodiments mentioned above in which the PUA is modifiable with the PUA user's assistance to carry out a designated secondary function, certain embodiments entail instructing the PUA user to take his/her PUA to a designated service center that will retrofit the PUA with appropriate software and/or hardware modifications to enable it to implement the designated secondary function. In other embodiments, the PUA user performs the modification, such as by coupling the PUA to a computer for the transfer and installation of suitable code into the PUA. The code may be supplied to the PUA user's computer in various manners, such as by e-mail, downloading from an Internet site, from a CD-ROM mailed to or other otherwise obtained by the PUA user (e.g., at a retail establishment or entertainment facility) or other method.

[000178] After the PUA is initialized in the various embodiments described herein, various additional communications between the PUA and managing processor 600 are carried out. In certain embodiments, software/hardware tests or self-tests are executed to verify proper operation of the PUA. In certain embodiments, third parties, such as service providers, provide and receive various communications to and from the PUA to verify proper operation of the secondary function. In various embodiments, software

tests and/or self-tests occur prior to PUA initialization. In various embodiments, PUA calibration is carried out. In certain embodiments calibration includes clock calibration and/or location calibration.

[000179] Communications from managing processor 600 to the PUA may further include one or more parameters in certain embodiments. Parameters include, without limitation, (1) what to track; (2) when/where to track; (3) amount/type of data to gather; (4) type of processing, if any, of the gathered data; and (5) where/when and manner of sending the raw or processed data. None, some or all of these parameters may be preprogrammed within the PUA or be communicated to the PUA during or after initialization. These parameters are further described below.

[000180] What to Track: What to track refers to the specific secondary function to be implemented by the PUA. Various examples of what to track are provided above and are disclosed in the various patents and patent applications mentioned herein. These examples are not exhaustive. Tracking may also entail not gathering data, but rather supplying a signal to enable other devices to gather research data.

[000181] When/Where to Track: The PUA may be programmed to implement the secondary function continuously or periodically. Conservation of battery life, limited data storage, limited bandwidth and other reasons may play a role in the extent (e.g., frequency and/or duration) of implementation of the secondary function. Frequency and/or duration of implementation of the secondary function also may differ on a day by day basis. In certain embodiments, the PUA is programmed to implement the secondary function only in designated locations, if appropriate (e.g., certain geographic locations, only when certain signals are received by the PUA).

[000182] Amount/Type of Data to Gather: The PUA may be programmed to collect more data or less data and/or different types of data.

Various examples of gathering different amounts of data are provided in US Published Patent Application 2005/0243784, previously referenced.

[000183] Type of Processing of Collected Data: The PUA may be programmed to store raw data or to process the raw data in accordance with various processing algorithms.

[000184] Where/When/Manner of Sending Data: When the secondary function entails gathering of research data by the PUA, the location of the destination to supply the gathered research data is provided. Various PUA's (e.g., cellular telephone PUA's) are capable of supplying data to a called telephone number and, in such cases, the telephone number to call is supplied. In certain other types of PUA's, data is sent via e-mail or other kind of database, in which cases, the e-mail address to send the gathered research data is supplied. In certain other types of PUA's, the PUA's employ a docking station, often utilized to recharge batteries within the PUA's. Certain docking stations can be modified to communicate with the docked PUA and to supply the gathered research data to a particular destination (e.g., by telephoning the destination). Suitable techniques for transferring data utilizing a docking station are disclosed in US Patent No. 5,483,276 to Brooks, et al, assigned to the assignee of the present application and hereby incorporated herein in its entirety. When the gathered data is sent (e.g., daily, hourly, when storage capacity used reaches a certain level) also may be programmable or may be manually determined (e.g., each time the PUA is placed in the docking station).

[000185] After a PUA user has accepted participation in a panel, initialization of the PUA, and various other communications are carried out, as herein described, the PUA implements the designated secondary function. As discussed herein, various secondary functions employ gathering of either raw or processed research data. Other secondary functions discussed herein entail transmitting data by the PUA to enable other devices, not carried by the PUA user, to gather research data.

[000186] In certain embodiments, the PUA implements two secondary functions, a first of which entails gathering by the PUA of research data and a second which entails transmitting data by the PUA to enable other electronic devices to gather research data. In certain embodiments, the PUA implements two secondary functions, both of which entail the PUA gathering research data. In yet other embodiments, the PUA implements two secondary functions both of which entail transmitting information to enable other devices to gather research data. In yet other embodiments, more than two secondary functions are implemented.

[000187] A PUA may implement multiple secondary functions for purposes of gathering data for one or more studies. In certain embodiments, a PUA user participates in multiple panels each making use of the PUA (or a single panel seeking to gather two different types of research data). In certain embodiments, a PUA user is invited to join a second panel after having already joined a first panel. Thus, each of the various research operations described herein may occur multiple and at different times. For example, while a PUA is gathering research data pertaining to user exposure to audio content (e.g., the secondary function entails converting acoustic energy to audio data, and decoding the audio data to extract the research data therefrom), the same PUA user is invited to participate in another study (or an extension of the same study) pertaining to consumer exposure to billboards (e.g., wherein the secondary function for the second study entails the PUA emitting an identification signal that is received by electronic devices disposed in the vicinities of particular billboards). In this example, the PUA has a first secondary function of gathering research data and a second secondary function that enables other electronic devices to gather research data. There are numerous techniques for gathering various types of research data (some of these techniques are disclosed in the patents and patent applications identified herein) and, thus, a large number of combinations of techniques may be employed utilizing particular types of PUA's.

[000188] When a user's participation in a panel is terminated, the managing processor 600 provides a communication to the user's PUA to initiate or control the PUA to discontinue its implementation of a designated secondary function. In certain embodiments, the PUA user is informed of the termination via the PUA's interface with the user. In certain embodiments, the user is notified by other means, such as by mail, telephone, e-mail or other communication.

[000189] In certain embodiments, the PUA automatically terminates its implementation of the secondary function at a predetermined time. The predetermined time is communicated from the managing processor to the PUA prior to termination, either during initialization of the PUA as a parameter or while the PUA is gathering research data, or another time.

[000190] In certain embodiments, the PUA is pre-programmed during initialization or other time to self-terminate implementation of the secondary function if a designated rule is not complied with by the user or if a designated event occurs. For example, a panel membership rule may require the PUA user to carry the PUA around for at least eight (8) hours per day and for at least five (5) days each week during the panel study. If the PUA user does not comply with this rule, in certain embodiments the user's PUA automatically discontinues the secondary function and thus no longer gathers, stores and/or communicates research data. During subsequent communications between the PUA and the managing processor, the managing processor removes the PUA user from the list of active panel members for the particular study being carried out. In certain embodiments, the PUA is programmed to provide the user with warnings or reminders of rules and requirements of the study, and/or violations thereof to prevent, or at least minimize, non-compliance.

[000191] In certain embodiments, the PUA is programmed to periodically perform self-tests to verify proper operability of the secondary function.

[000192] In certain embodiments, the PUA user is afforded the opportunity to discontinue his/her membership in a panel. PUA user communication with the managing processor via the PUA may be possible to terminate membership. In other variations, the PUA user may terminate membership via other communication means, such as by telephone, e-mail, etc.

[000193] Upon the termination of the user's membership in a panel, in certain embodiments the PUA discontinues implementation of a designated secondary function. In certain ones of such embodiments, software previously downloaded is uninstalled or otherwise removed from the PUA, or deactivated.

[000194] In various embodiments described herein, the identity of the PUA user or data suitable for identifying the user is obtained using various public and possibly non-public resources and databases. User identity includes at least a unique identifier for the user, and preferably address and other demographic information, including occupation, age, gender and other data useful for media and/or market research purposes. In certain embodiments, user identification information is obtained from the user via the user's PUA. For example, in a notebook computer PUA or a cellular telephone PUA, the user is prompted to provide identification information during recruitment of the user into the panel. In other embodiments, the PUA user is requested to provide identification information through means other than via the PUA. For example, in certain embodiments the PUA user is prompted during recruitment to access a website, complete and mail a form or place a telephone call in order to provide requested identification information. In certain embodiments, the PUA user becomes a member of the panel only after required identification information is supplied.

[000195] In certain embodiments described herein, a user is deemed to own, lease or otherwise possess a PUA for a sufficiently large period of time so that a particular PUA is deemed to be associated with a particular user for the entire period of the study being conducted. In certain other embodiments, a particular PUA is not associated with a single user for the entire period of the

study, but rather is associated with multiple users. In certain instances, the multiple users are members of the same household. A cellular telephone or laptop computer sometimes is utilized at different times by different members of a household. Other types of PUA's are utilized by multiple individuals who are not part of the same household. Various examples are provided below.

[000196] In embodiments where a PUA is known to have multiple users, the PUA is programmed or otherwise controlled to ascertain or assist in ascertaining the identity of a user at a given instance, period of time or from time to time. In certain embodiments, user identification is provided subsequent to use, via communications between the user and the managing processor through other means, such as by e-mail, website access, telephone, in-person contact, or other technique. In certain embodiments, user identification information is supplied in advance of use of the PUA. In certain embodiments, a user identifies his/her termination of usage of the PUA.

[000197] In certain embodiments described herein, the identification of a PUA user is not known during the gathering of research data pertaining to that user. In various embodiments, the PUA user has authorized participation in the panel prior to the PUA's gathering of research data. In certain other embodiments, research data is gathered by a PUA (whether used by a single user or by multiple users) without prior authorization by the PUA user or users. After use, a particular user may voluntarily supply or be motivated via an incentive to supply, identification information to the managing processor (e.g., utilizing the Internet), at which point the previously obtained research data is associated with an identified person.

[000198] In certain embodiments, incentives to participate are offered. Various incentives, depending on the embodiment, include benefits related to use of the PUA, such as PUA-supplied services, award points or credits (e.g., free cellular telephone use, free play time for a game device PUA). Certain incentives do not relate to use of the PUA, such as award points or award dollars

applicable for use or purchases at retail stores, Internet sites and other locations. Other incentives include free software or unique content available only to panelists.

[000199] In certain embodiments employing incentives, benefits accrue during the period in which a PUA user remains a panel member. In other embodiments, benefits accrue during periods of time the PUA gathers research data, thus encouraging use and/or carrying around of the PUA. In further embodiments, benefits accrue when research data is received by the managing processor 600.

[000200] Various illustrative PUA's are presented herein, such as cellular telephones, PDA's, portable storage devices, pens, and notebook computers. As previously discussed, however, many different types of devices, electronic and non-electronic, may be employed as a PUA in accordance with various embodiments described herein. For example, a belt buckle, ring, watch, shoe, etc., may be retrofitted with technology that implements a designated secondary function to enable the gathering of research data. Thus, the scope hereof is not limited to devices that have technical features or technical capabilities as their primary or only function.

[000201] In general, the embodiments described herein employ PUA's for the purpose of carrying out research operations, which are also the kinds of devices or articles that individuals have already freely chosen to use or carry for other purposes beneficial to them. Hence, recruited panel members are not burdened with the task of carrying around a device that they would otherwise not carry around. Moreover, in many embodiments, implementation of the research operation by the user's PUA is transparent to the user.

[000202] Although various embodiments have been described with reference to a particular arrangement of parts, features and the like, these are not intended to exhaust all possible arrangements or features, and indeed many

other embodiments, modifications and variations will be ascertainable to those of skill in the art.

What is claimed is:

1. A method for setting up, promoting, operating, maintaining and/or terminating a research operation carried out automatically with the use of a PUA, comprising:

communicating a message to a PUA and/or to a user of a PUA comprising at least one of instructions for participating in a research operation carried out automatically by means of the PUA, a message for the user of the PUA providing or offering to provide a benefit to the user in exchange for the user's participation in a research operation, a message requesting a response from the user identifying the user, and a command or a request for the PUA to automatically gather, store and/or communicate research data; and

receiving a participation message from at least one of the PUA, the user of the PUA and the benefit provider.

2. The method of claim 1, wherein the participation message comprises at least one of research data gathered automatically by the PUA, a message from the PUA indicating an operational status or ability thereof to carry out a research operation, a message from the user of the PUA concerning participation of the user in the research operation, a message from the user of the PUA identifying such user, and a message from the PUA indicating receipt thereby of an activation message.

3. The method of claim 2, wherein the participation message comprises a message from the user of the PUA indicating agreement to participate in the research operation.

4. The method of claim 3, comprising communicating a message for the user of the PUA providing or offering to provide a benefit to the user in exchange for the user's participation in a research operation, and wherein the PUA

comprises a personal communication device and the benefit comprises a communication service provided by means of the PUA.

5. The method of claim 4, wherein the PUA comprises a cellular telephone.

6. The method of claim 3, comprising, in response to the participation message, communicating a message to a credit facility to transfer the at least one of a cash benefit and a credit to an account of the user.

7. The method of claim 3, comprising, in response to the participation message, communicating a message to a service provider requesting provision of a service to the user.

8. The method of claim 3, comprising, in response to the participation message, communicating a message to the user comprising media data for the user's benefit and/or data enabling the user to access media data for the user's benefit.

9. The method of claim 1, comprising storing data identifying the PUA and identifying a user thereof, and communicating a maintenance message to the PUA after storage of the identifying data.

10. The method of claim 1, comprising communicating a message to the PUA comprising instructions for participating in a research operation carried out automatically by means of the PUA.

11. The method of claim 1, comprising communicating a message to the PUA requesting a response from the user identifying the user.

12. The method of clam 11, wherein the participation message comprises a message identifying the user.

13. The method of claim 1, comprising communicating a command or request for the PUA to automatically gather, store and/or communicate research data.

14. A method for setting up, promoting, operating, maintaining and/or terminating a research operation carried out automatically with the use of a PUA, comprising:

communicating at least one of an activation message, a maintenance message and a termination message to a PUA, to a user of a PUA and/or to a benefit provider; and

receiving a participation message from at least one of the PUA, the user of the PUA and the benefit provider; and

wherein the participation message comprises at least one of a message from the PUA indicating an operational status or ability thereof to carry out a research operation, a message from the PUA indicating an availability thereof to carry out a research operation, and a message from the user of the PUA identifying the user.

15. The method of claim 14, comprising storing data identifying the PUA and identifying a user thereof, and communicating a maintenance message to the PUA after storage of the identifying data

16. The method of claim 14, wherein the participation message comprises a message indicating an ability of the PUA to carry out a research operation.

17. The method of claim 14, wherein the participation message comprises a message indicating an availability of the PUA to carry out a research operation.

18. The method of claim 14, wherein the participation message comprises a message from the PUA indicating an operational status thereof.

19. The method of claim 14, wherein the participation message comprises a message from the user of the PUA identifying the user.

20. A method for setting up, promoting, operating, maintaining and/or terminating a research operation carried out automatically with the use of a PUA, comprising:

communicating at least one of an activation message, a maintenance message and a termination message to a PUA, to a user of a PUA and/or to a benefit provider; and

receiving a participation message from at least one of the PUA, the user of the PUA and the benefit provider; and

further comprising communicating a termination message to at least one of the PUA and a benefit provider.

21. The method of claim 20, wherein the participation message comprises at least one of a message from the PUA indicating that a function thereof to carry out a research operation has been deactivated and a message from the PUA indicating receipt thereby of the termination message.

22. The method of claim 21, wherein the termination message comprises a deactivation message for the PUA to deactivate a function thereof to carry out a research operation.

23. The method of claim 22, comprising providing a control operable by the user to deactivate at least one additional function of the PUA to carry out a research operation.

24. The method of claim 20, wherein the termination message comprises a deactivation message for the user of the PUA instructing the user to deactivate a function of the PUA to carry out a research operation.

25. The method of claim 24, comprising providing a control operable by the user to deactivate an additional function of the PUA to carry out a research operation.

26. The method of claim 25, comprising providing the control operable by the user on the condition that the function is deactivated by the user.

27. The method of claim 24, comprising, on the condition that the user has deactivated the function, crediting an account of the user with a final consideration.

28. The method of claim 20, wherein the termination message comprises a benefit message to a benefit provider for providing a final consideration for the user's participation in the research operation.

29. A method of gathering research data, comprising:

receiving a message from a user's PUA including research data and identification data identifying the user's PUA; and

storing the research data, together with an identification of the user's PUA from which it was received.

30. A method of recruiting a person to participate in a research operation, comprising:

communicating a recruitment message as media data to a plurality of PUA users to solicit participation in the research operation; and

receiving a participation message from a PUA of a user who received the recruitment message.

31. A method of recruiting persons within a population to participate in a research operation, comprising:

obtaining a list of cellular telephone numbers of persons within a population;

communicating a message addressed to at least some telephone numbers in the cellular telephone number list soliciting participation of persons in a research operation; and

communicating a message to cellular telephones corresponding to the at least some telephone numbers to initiate, provide or enable a capability of the cellular telephones to carry out a research operation.

32. A method of recruiting PUA users within a population to participate in a research operation, comprising:

communicating a recruitment message to PUA's of PUA users within a population to solicit participation in the research operation; and

if a response to the recruitment message is received from a PUA user indicating an unwillingness to participate in the research operation or if no response thereto is received, storing negative data indicating a failure to recruit the PUA user to participate in the research operation and subsequently communicating a further recruitment message to the PUA user to solicit participation in the research operation.

33. The method of claim 32, comprising communicating the further recruitment message at a time differing from a time of communication of the recruitment message.

34. The method of claim 32, comprising communicating the further recruitment message based on a content of the response from the PUA user.

35. A method of administering surveys to persons for gathering research data, comprising:

communicating a first survey including a first number of questions to a person;

receiving a response to the first survey from the person;

based on the response, selecting a second survey including a second number of survey questions, the second number of survey questions being fewer than the first number of survey questions; and

communicating the second survey to the participant.

36. The method of claim 35, wherein the response to the first survey includes answers to a number of the survey questions less than the first number.

37. The method of claim 36, wherein the second number of survey questions is based on the number of survey questions of the first survey which were answered.

38. A method of terminating participation of a person in a research operation carried out by means of a PUA used by the person, comprising:

at least one of: (1) communicating a deactivation message to the PUA used by the person to deactivate a capability thereof to carry out a research operation; (2) communicating a deactivation message to the person instructing them to deactivate a capability of the PUA to carry out a research operation; and (3) providing a benefit to the person as a final consideration for the person's previous participation in the research operation.

39. A method of operating a PUA in the course of setting up, operating, maintaining and/or terminating a research operation carried out automatically with the use of the PUA, comprising:

receiving a maintenance message in a PUA including at least one of a message requesting a response from the user identifying the user and a command or request to the PUA to automatically gather, store and/or communicate research data; and

communicating a participation message from the PUA.

40. The method of claim 39, wherein the participation message comprises a message identifying the user.

41. The method of claim 39, wherein the participation message comprises at least one of research data gathered by the PUA and a message indicating receipt by the PUA of the maintenance message.

42. The method of claim 39, comprising communicating data identifying the PUA and identifying a user thereof, and wherein the maintenance message is received by the PUA after communication of the identifying data.

43. The method of claim 39, wherein the participation message comprises a message indicating an ability of the PUA to carry out a research operation.

44. The method of claim 39, wherein the participation message comprises a message indicating an availability of the PUA to carry out a research operation.

45. A method of operating a PUA in the course of setting up, operating, maintaining and/or terminating a research operation carried out automatically with the use of the PUA, comprising:

receiving a termination message in a PUA; and

communicating a participation message from the PUA.

46. The method of claim 45, wherein the participation message comprises at least one of a message indicating that a function of the PUA for gathering, storing and/or communicating research data has been deactivated and a message indicating receipt by the PUA of the termination message.

47. The method of claim 46, wherein the termination message comprises a deactivation message for the PUA to deactivate a function thereof to carry out a research operation.

48. The method of claim 47, comprising providing a control operable by the user to deactivate at least one additional function of the PUA to carry out a research operation.

49. The method of claim 45, wherein the termination message comprises a deactivation message for the user of the PUA instructing the user to deactivate a function of the PUA to carry out a research operation.

50. The method of claim 49, comprising providing a control operable by the user to deactivate an additional function of the PUA to carry out a research operation.

51. The method of claim 50, comprising providing the control operable by the user on the condition that the function is deactivated by the user.

52. A method of terminating participation of a person in a research operation by means of a PUA used by the person, comprising:

at least one of: (1) receiving a deactivation message in the PUA used by the person to deactivate a capability thereof to carry out a research operation;

and (2) inputting a deactivation command in the PUA instructing it to deactivate a capability thereof to carry out a research operation.

53. A method of recruiting a user of a PUA to participate in a research operation, comprising:

communicating a participation message from the PUA of the user relating to participation in a research operation; and

communicating, in response to a message from the user, an initiation message to the PUA of the user to initiate, enable or establish a capability of the PUA to carry out a research operation; and

further comprising communicating at least one of a data collection type to the PUA of the user specifying a type of data to collect by means of the PUA, calibration data to the PUA for use in calibrating an operation of the PUA and destination data to the PUA specifying a destination for research data gathered or received by the PUA..

54. The method of claim 53, comprising communicating a data collection type to the PUA comprising one of audio data, location data, purchase data, presence data, exposure to advertisements data, and responses to questions data.

55. The method of claim 53, comprising communicating calibration data to the PUA for carrying out an operation for calibrating at least one of a clock of the PUA and a location of the PUA.

56. A method of terminating participation of a PUA user in a research operation by means of a PUA of the user, comprising:

receiving a deactivation message in the PUA comprising data for deactivating at least one function of the PUA to carry out a research operation, without deactivating at least one additional function of the PUA to carry out a research operation; and

providing a control operable by the PUA user to deactivate the at least one additional function of the PUA.

57. The method of claim 56, comprising providing the control operable by the PUA user conditioned on receipt of the deactivation message by the PUA.

58. A method of initiating participation of a PUA user in a research operation using multiple PUA's, comprising:

assigning user identification data to the user;

associating the user identification data with data identifying multiple PUA's used by the user; and

at least one of (1) activating or enabling each of the multiple PUA's to carry out a research operation, and (2) receiving research data from plural ones of the multiple PUA's.

59. The method of claim 58, comprising storing data associating the user identification data with data identifying multiple PUA's used by the user in a database accessible by a research organization.