supported, including absolute or relative positional information as determined by gyroscopic sensors, accelerometers, or acoustic or infrared ranging techniques. Environmental sensors, including conventional light, image, thermal, electromagnetic, vibratory, or acoustic sensors can also be present. Depending on the desired application, even costly environmental or positional sensors such as those incorporating differential GPS positioning, image analysis or recognition, acoustic or voice identification, or differential thermal sensors can be used as morphemic input. Such morphemic input, taken in conjunction with morphemic input as detected by sensor mesh **22**, can enhance precision and flexibility of a user's control of device **10**.

[**0041**] As illustrated, both sensor system **28** and sensor mesh **22** are connected to the processor **24** and associated memory **26**. The processor **24** and memory **26** are typically mounted within the deformable surface **20**, by either direct attachment to the deformable surface **20** or by attachment to a hard casing positioned within the deformable surface **20**. Conventional CISC or RISC processors can be used in the illustrated embodiment, with low power processors such as the Signetics: 87c752 or 87c751, Motorola 68HC11 or 68582, or ARM 710 being preferred. If convenient, coprocessors such as analog to digital converters or digital signal processors can be used alone or in conjunction with a main processor. Conventional flash, static, or dynamic RAM can used in the present invention, although for certain applications higher cost embedded DRAM may also be used. In some storage intensive applications, memory **26** can include additional harddisk storage, either located within the device **10** or available through an external connection. As will be appreciated, for many applications use of optional external communications can at least partially supplant use of internal processors and memory (except for that necessary to support required sensor or communication buffering and signalling).

[**0042**] The present invention optionally supports communications with an external computer system **40** using its internal communications system **32** and associated transceiver **34**. The external computer system **40** also includes a transceiver **42**, a personal computer or workstation **44**, and is connected to a local or wide area network computer system **46**. The transceivers **34** and **42** can support various communication protocols and designs, including use of a serial tethered line **36** (using, for example the RS-232C interface protocols), use of infrared signals **38** adhering to widely utilized IRDA communication standards, or use of radiofrequency signal **37** (which can be, for example, a cellular telephone, 900 MHz radio, or digital PCS telephonic communications). Alternative communication standards, or even alternative communication carriers such as those based on optical or acoustic techniques, can of course be employed.

[**0043**] As will be appreciated, in addition to direct communication with external computer system **40**, the device **10** can be directly or indirectly maintained in continuous or intermittent communication with a number of suitably equipped electronic devices, including a tablet computer **110**, or even a physically manipulatable portable computer **11** similar in design and function to device **10**. Communication can be direct to a target device, or through an intermediary retransmitter such as computer system **40**. Other possible communication targets include automation control systems, security authorization units, personal digital assistants, notebook computers, or any other suitably equipped electronic system.

[**0044**] Results of communications with external devices, presentation of device stored information, or device status updates can all be provided to a user through processor **24** controlled update of feedback module **33**. Feedback to a user can be primarily visual, such as can occur in conjunction with visual display **30**. Generally, the display **30** can be a conventional passive or active matrix liquid crystal display, although use of more sophisticated (and expensive) displays based on various electrooptical or micromechanical techniques can of course be used. In addition, for certain devices a non-imaging display such as may be formed by a small number of status lights (e.g. red or green LEDs), or localized or distributed chromatic changes (in conjunction with a deformable surface **22** constructed with suitable electrochromic materials) may be all that is necessary for visual feedback to the user.

[**0045**] In some embodiments of the invention, visual output through display **30** may be augmented (or even replaced) with a non-visual display **31**. The non-visual display **31** can include tactile displays based on internal actuators, auditory feedback, or even displays based on conformal changes in device appearance. For example, one possible feedback display is based on internal auditory speakers (emitting a range of sounds from simple "beeps" to well formed speech, depending on available processor speed and functionality) for providing user feedback. As will be appreciated, non-visual display **31** and its associated actuators or electronics can support alternative feedback modes, including, for example, force feedback to a user through internal actuators, tactile based feedback (e.g with multiple surface projections for presentation of Braille or other conventional tactile user interface), modifications to the surface texture of the device, or any other conventional mechanism for supplying information to a user.

[**0046**] To better appreciate operation of the present invention, some selected modes of physical manipulation of device **10** are schematically presented in **FIG. 1**., As seen in **FIG. 1**, device **10** can be translationally moved in three spatial dimensions, as illustrated with reference to orthogonal force arrows **50**, **51**, and **52**. In addition to translational motion, the device **10** can be rotationally moved in any or all three spatial dimensions, as represented by arrows **53**, **54**, and **55**. By use of sensor system **28** (alone or in combination with communication system **32**), the relative or absolute position and orientation in three dimensions can be determined.

[**0047**] In addition to determining spatial position and orientation through use of sensors **28**, the device **10** can optionally use sensor mesh **22** to measure and localize transient or continuing force application, with force vectors and related timing information being determined and interpreted. A few possible force actions (deformation modes) are schematically illustrated in **FIG. 1**, with arrows **60** and **61** illustrating depression of surface **20** (with the combination representing a squeeze), arrows **62** and **63** illustrating sliding or rubbing deformation (with the combination representing a twist), and the combination of sliding arrows **65** and **66**, and outward pull **67**, together representing a pinch and outward pull. The strength of the applied force can be