("LRA") or MEMS springs. Each cell **802**, however, is configured to have a slightly different resonant frequency and a high Q (high amplification at resonance and a narrow resonant frequency band). As such, each cell **802** can be stimulated using mechanical pressure waves originating at the edges of the sheet. The haptic effects can also be generated by a piezoelectric or other high bandwidth actuator.

[0074] Cell **802**, in another embodiment, includes one spring **808**. In yet another embodiment, cell **802** includes more than two springs **808**. Each spring **808** is configured to respond to a specific range of frequencies thereby each spring **808** can produce a unique haptic sensation. As such, a grid of haptic cells using various resonant devices may be used to control the surface texture of touch-sensitive surface of the interface device. For example, if the displacement of haptic mechanism is sufficiently high such as 200 micrometers or greater, the movement (or tactile vibration) with low frequencies such as 50 Hz or less should sufficiently create desirable relief information.

[0075] The exemplary embodiment(s) of the present invention includes various processing steps which will be described below. The steps of the embodiments may be embodied in machine or computer executable instructions. The instructions can be used to cause a general purpose or special purpose system, which is programmed with the instructions, to perform the steps of the present invention. Alternatively, the steps of the present invention may be performed by specific hardware components that contain hardwired logic for performing the steps, or by any combination of programmed computer components and custom hardware components. While embodiments of the present invention will be described with reference to the Internet, the method and apparatus described herein is equally applicable to other network infrastructures or other data communications environments.

[0076] FIG. **9** is a flowchart illustrating a process **500** of providing locating features on a deformable haptic surface in accordance with one embodiment of the present invention. At block **902**, the process maintains the touch-sensitive surface in a first surface characterization. The first surface characterization, for example, is a rough surface texture. In one embodiment, the process maintains a coarse textured surface. The coarse textured surface has a rough surface including bumps or sharp edges emulating edges of a button. After block **902**, the process moves to block **904**.

[0077] At block **904**, the process receives a command for activating haptic feedback. For example, the process receives a command initiated by a user. Alternatively, the process receives a command issued by a logic processing device. After block **904**, the process proceeds to the next block.

[0078] At block **906**, the process activates a haptic mechanism in response to the command. The process, in one embodiment, creates bump or button sensation on the surface of the touch-sensitive surface. For example, the process activates the haptic mechanism by allowing various pins on the haptic mechanism to reach above or below the touch-sensitive surface to create bump or button sensation. In one embodiment, the process facilitates or controls the pins in a predefined conduit to control the texture of the surface. Alternatively, the process shifts the haptic mechanism laterally with respect to the touch-sensitive surface to form bump or hole sensation on the touch surface. Also, the process pushes the touch-sensitive surface to control surface texture by buckling the touch surface. Once the haptic mechanism is deactivated, the touch surface or touch-sensitive surface returns to its surface original texture format. After block **906**, the process moves to the next block.

[0079] At block **908**, the process generates haptic feedback to change surface texture of the touch-sensitive surface from a first surface characterization to a second surface characterization. In one embodiment, the process also senses a contact or a touch on the touch-sensitive surface and subsequently, generates an input signal in response to the contact. In another embodiment, the process further generates confirmation tactile feedback to confirm the sensed contact or touch on the touch-sensitive surface. After block **908**, the process ends.

[0080] While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that, based upon the teachings herein, changes and modifications may be made without departing from this invention and its broader aspects. Therefore, the appended claims are intended to encompass within their scope of all such changes and modifications as are within the true spirit and scope of the exemplary embodiment(s) of the present invention.

What is claimed is:

1. An interface device comprising:

a haptic mechanism operable to provide haptic feedback in response to an activating command; and

a touch-sensitive surface coupled to the haptic mechanism and capable of changing its surface relief from a first surface characteristic to a second surface characteristic in response to the activating command.

2. The device of claim **1**, wherein the haptic mechanism operable to provide haptic feedback further includes a first tactile feedback and a second tactile feedback, wherein the first tactile feedback causes the touch-sensitive surface to deform, and wherein the second tactile feedback confirms an input selections.

3. The device of claim **1**, wherein the haptic mechanism includes a plurality of pins, wherein the plurality of pins moves above the touch-sensitive surface and moves below the touch-sensitive surface through a plurality of holes in the touch-sensitive surface.

4. The device of claim **1**, wherein the haptic mechanism includes a lateral displacement mechanism, wherein the lateral displacement is capable of changing the surface relief of the touch-sensitive surface by moving the touch-sensitive surface laterally against the haptic mechanism.

5. The device of claim **1**, wherein the haptic mechanism includes a plurality of air pockets, wherein the plurality of air pockets is capable of alter the surface relief of the touch-sensitive surface by filling and releasing air in the plurality of air pockets.

6. The device of claim **1**, wherein the haptic mechanism includes a plurality of haptic materials, wherein the plurality of haptic materials is operable to change the surface relief of the touch-sensitive surface by changing the physical sizes of the plurality of haptic materials.

7. The device of claim **1**, wherein the haptic feedback includes haptic acknowledgement to a user confirming a user input.

8. The device of claim **1**, wherein the surface relief includes bumps, holes, and a combination of bumps and holes.

9. The device of claim **1**, wherein the touch-sensitive surface is a flexible and deformable surface that is capable of sensing touches on the touch-sensitive surface.