CLAIMS

1. A self-powered triboelectric based device comprising

a base member comprising a first material,

an actuator member comprising a second material having a work function that differs from the first material disposed on a first surface of the base member, and

a plurality of electrodes electrically coupled to the base member;

wherein the plurality of electrodes are disposed in a manner such that a direction of a shear force component applied to the actuator member can be analysed based on electrical outputs measured via respective ones of the electrodes;

wherein the actuator member is sphere-shaped and the second material is comprised in contact points on a surface of the sphere-shaped actuator member; and

wherein the base member is integrally formed with the electrodes such that the electrodes comprise the first material.

2. The self-powered triboelectric based device of claim 1, wherein the actuator member is elastically deformable such that a normal force component applied to the actuator member can be analysed based on the electrical outputs measured via the respective ones of the electrodes.

3. The self-powered triboelectric based device of claims 1 or 2, wherein the self-powered triboelectric based device is configured for 2-dimensional or 3-dimensional sensing of control signals for providing a user control interface.

4. The self-powered triboelectric based device of any one of claims 1 to 3, further comprising a supporting structure for supporting the base member, the actuator member and the plurality of electrodes.

~~5. The self-powered triboelectric based device of any one of claims 1 to 4, wherein the actuator member is sphere-shaped and the second material is comprised in a semi-spherical portion of the actuator member.~~

~~6. The self-powered triboelectric based device of claim 5, wherein the first surface of the base member has a semi-spherical contour for receiving the semi-spherical portion of the actuator member.~~

~~7. The self-powered triboelectric based device of claims 6, wherein the second surface of the base member has a semi-spherical contour, and the plurality of electrodes are arranged in a semi-spherical contour for receiving the second surface of the base member.~~

5~~8~~. The self-powered triboelectric based device of any one of claims 1 to 4~~7~~, comprising four electrodes.

69. The self-powered triboelectric based device of any one of claims 1 to 58, wherein two of the self-powered triboelectric based devices are coupled together to form an integral device.

~~10. The self-powered triboelectric based device of any one of claims 1 to 4, wherein the actuator member is sphere-shaped and the second material is comprised in contact points on a surface of the sphere-shaped actuator member.~~

~~11. The self-powered triboelectric based device of claim 10, wherein the base member is integrally formed with the electrodes such that the electrodes comprise the first material.~~

712. The self-powered triboelectric based device of any one of claims ~~10 or 11~~1 to 6, wherein the electrodes comprise two sets of four electrodes each, each set being disposed circumferentially around four of the contact points at different and wherein the two sets and their respective associated contact points are disposed at different latitudes of the sphere-shaped actuator member.

~~13. A self-powered triboelectric based device comprising~~

~~a hollow base member comprising a first material,~~

~~one or more actuator members comprising a second material having a work function that differs from the first material disposed inside the hollow base member in a cavity defined by an internal surface of the base member, and~~

~~a plurality of electrodes disposed below the internal surface of the base member;~~

~~wherein the plurality of inner electrodes are disposed in a manner such that movement of the one or more actuator members can be analysed based on electrical outputs measured via respective ones of the inner electrodes.~~

~~14. The self-powered triboelectric based device of claim 13, wherein the one or more actuator members comprise one or more balls.~~

~~15. The self-powered triboelectric based device of claim 13, wherein the actuator member comprises the second material in liquid form.~~

~~16. The self-powered triboelectric based device of any one of claims 13 to 15, configured for 3-dimensional sensing of control signals for providing a user control interface and/or a gyroscope.~~

~~17. The self-powered triboelectric based device of any one of claims 13 to 16, configured for harvesting signals for conversion into energy.~~

~~18. The self-powered triboelectric based device of any one of claims 13 to 17, wherein the base member further comprises a plurality of outer electrodes covered by a layer made from a third material, such that further triboelectric signals can be measured via the outer electrodes responsive to an external material having a work function that differs from the third material co-operating with the third material.~~

~~19. The self-powered triboelectric based device of any one of claims 13 to 18, wherein the base member further comprises a plurality of additional electrodes covered by a layer made from a fourth material, such that additional triboelectric signals can be measured via the additional electrodes responsive to an external material having a work function that differs from the fourth material co-operating with the fourth material.~~

~~20. The self-powered triboelectric based device of claim 19, wherein the additional electrodes are covered by the fourth material on two opposing surfaces for cooperating with the external material.~~

821~~21~~. A user interface comprising the device as claimed in any one of claims 1 to 720~~20~~.

922~~22~~. A method of providing user input using the device as claimed in any one of claims 1 to 720~~20~~.

~~23. An energy harvesting device comprising the device as claimed in any one of claims 13 to 20.~~

~~24. A method of harvesting energy using the device as claimed in any one of claims 13 to 20.~~

~~25. A submersion-detecting device comprising the device as claimed in any one of claims 13 to 20.~~

~~26. A method of submersion-detecting using the device as claimed in any one of claims 13 to 20.~~