**CLAIMS**

1. A sensing device for measuring an offset along a longitudinal axis comprising:

a housing including a front surface having a plurality of slots;

two or more arrays, each array including a plurality of optical sensors which are linearly aligned along the longitudinal axis, at least one of the two or more arrays being offset in a direction of the longitudinal axis with respect to others of the at least two arrays while overlapping in longitudinal position along the longitudinal axis relative to the others of the at least two arrays such that the at least one of the two or more arrays has different end points as measured along the longitudinal axis of the device than the others of the at least two arrays;

a microcontroller coupled to the two or more arrays of optical sensors and configured to determine a positional offset along the longitudinal axis at which a laser reference beam is detected by at least one of the two or more optical sensor arrays;

in which each of the optical sensors of the two or more arrays are positioned within the housing directly underneath one of the plurality of slots, each of the plurality of slots having edges that are aligned with edges of the respective array of optical sensors positioned underneath.

2. A sensing device according to Claim 1, in which the two or more arrays of optical sensors together cover all positions along a span of distance along the longitudinal axis.

3. A sensing device according to Claim 1, further comprising at least one filter element positioned within the housing and at least partially covering the optical sensors of the two or more arrays so as to block wavelengths other than the wavelength of the laser reference beam from reaching the optical sensors.

4. A sensing device according to Claim 1, further comprising:

an additional array of optical sensors arranged linearly with respect to a traverse axis perpendicular to the longitudinal axis,

in which the microcontroller is coupled to the additional array of optical sensors and is configured to determine a positional offset along the transverse axis at which a laser reference beam is detected by the additional array of optical sensors.

5. A sensing device according to Claim 1, in which at least one of the two or more arrays of optical sensors is positioned at different depths beneath the plurality of the slots than others of the two or more arrays.

6. A sensing device according to Claim 1, in which the two or more arrays of optical sensors include photodiodes sensitive to a specific wavelength of laser reference beam.

7. A sensing device according to Claim 1, further comprising an accelerometer adapted to measure a tilt of the device with respect to a gravity vector.

8. A sensing device according to Claim 1, in which the two or more arrays of optical sensors include:

a first array of optical sensors linearly aligned along the longitudinal axis;

a second array of optical sensors linearly aligned along the longitudinal axis adjacent to and offset along the longitudinal axis with respect to the first array; and

a third array of optical sensors arranged linearly aligned along the longitudinal axis, the third array positioned adjacent to and offset along the longitudinal axis with respect to the second array opposite from the first array.

9. A sensing device for measuring an offset along a longitudinal axis comprising:

a housing having a front surface;

two or more arrays, each array including a plurality of optical sensors which are linearly aligned in a direction of the longitudinal axis within the housing, at least one of the two or more arrays while overlapping in longitudinal position along the longitudinal axis relative to the others of the at least two arrays such that at least one of the two or more arrays has different end points as measured along the longitudinal axis than the others of the at least two arrays;

a microcontroller coupled to the two or more arrays of optical sensors and configured to determine a positional offset along the longitudinal axis at which a laser reference beam is detected by at least one of the two or more arrays of optical sensors;

in which each of the optical sensors of the two or more arrays are positioned within the housing directly underneath one of the plurality of slots, each of the plurality of slots

having edges that are aligned with edges of the respective array of optical sensor positioned underneath, and

in which one of the two or more arrays is positioned at a different depth beneath the front surface of the housing than the other arrays.

10. A sensing device according to Claim 9, in which each of the optical sensors of the two or more arrays are positioned within the housing underneath one of the plurality of slots, so as to reduce an angle of incidence of radiation received by the optical sensors of the two or more arrays.

11. A sensing device according to Claim 9, in which the two or more arrays cover all positions along a span of distance along the longitudinal axis of the device.

12. A sensing device according to Claim 9, further comprising:

an additional array of optical sensors arranged linearly with respect to a traverse axis perpendicular to the longitudinal axis,

in which the microcontroller is coupled to the additional array of optical sensors and is configured to determine a positional offset along the transverse axis at which a laser reference beam is detected by the additional array of optical sensors.

13. A sensing device according to Claim 10, in which at least one of the two or more arrays is positioned at different depths beneath the plurality of the slots than others of the two or more arrays.

14. A sensing device according to Claim 9, in which the two or more arrays of optical sensors include photodiodes sensitive to a specific wavelength of laser reference beam.

15. A sensing device according to Claim 9, further comprising an accelerometer adapted to measure a tilt of the device with respect to a gravity vector.

16. A sensing device according to Claim 9, in which the two or more arrays of optical sensors include:

a first array of optical sensors linearly aligned along the longitudinal axis;

a second array of optical sensors linearly aligned along the longitudinal axis adjacent to and offset along the longitudinal axis with respect to the first array; and

a third array of optical sensors arranged linearly aligned along the longitudinal axis, the third array positioned adjacent to and offset along the longitudinal axis with respect to the second array opposite from the first array.