What is claimed is:

1. A magnetic recording disk drive comprising:

a disk drive base;

a spindle motor attached to the base and having a rotational axis;

a magnetic recording disk mounted to the spindle motor for rotation about said rotational axis;

a rotary actuator attached to the base;

a recording head attached to the actuator and movable across the disk in a generally arcuate path from a head inside diameter position (h_{ID}) to a head outside diameter position (h_{OD});

a first vibration sensor attached to the base and having a vibration sensitivity axis generally parallel to a radius from the spindle motor rotational axis to a head position between h_{ID} and h_{OD};

a second vibration sensor attached to the base, the second vibration sensor being spaced from the first vibration sensor and having a vibration sensitivity axis generally parallel to the vibration sensitivity axis of the first vibration sensor; and

a third vibration sensor attached to the base and having a vibration sensitivity axis generally orthogonal to the vibration sensitivity axis of the first vibration sensor.

2. The disk drive of claim 1 wherein the disk drive includes a printed circuit board attached to the base and wherein the first, second and third vibration sensors are mounted on the printed circuit board.

3. The disk drive of claim 1 wherein there are three and only three vibration sensors.

4. The disk drive of claim 1 wherein each of the vibration sensors is a single-axis accelerometer.

5. The disk drive of claim 1 wherein the spaced-apart first and second vibration sensors are aligned along a line through said rotational axis.

6. The disk drive of claim 1 wherein the third vibration sensor has its sensitivity axis aligned along a line through said rotational axis.

7. A magnetic recording disk drive comprising:

a disk drive base;

a spindle motor attached to the base;

a magnetic recording disk mounted to the spindle motor and rotatable about an axis, the disk having a plurality of concentric data tracks containing servo positioning information;

a recording head movable across the disk in a generally arcuate path from a head inside diameter position (h_{ID}) to a head outside diameter position (h_{OD}), the head being capable of reading data and servo positioning information in the data tracks;

a voice-coil-motor (VCM) attached to the base for moving the head;

first and second spaced-apart linear vibration sensors attached to the base and having primary axes generally parallel to a radius from the disk rotational axis to a head position between h_{ID} and h_{OD} for detecting rotational vibration about the disk rotational axis and linear vibration in the cross-track direction;

a third linear vibration sensor attached to the base and a having a primary axis generally orthogonal to the primary axes of the first and second vibration sensors for detecting primarily linear vibrations in the track circumferential direction;

a processor;

memory associated with the processor;

and a program of instructions stored in memory and readable by the processor for undertaking method acts comprising:

(a) receiving a digitized signal S1 from the first linear vibration sensor, a digitized signal S2 from the second linear vibration sensor, and a digitized signal S3 from the third linear vibration

sensor;

(b) calculating a rotational vibration feedforward (RV-FF) signal from S1 and S2 representing the difference between S1 and S2;

(c) calculating a radial linear vibration feedforward (LVr-FF) signal from S1 and S2 representing the sum of S1 and S2;

(d) calculating a circumferential linear vibration feedforward (LVc-FF) signal from S3;

(e) calculating a VCM control signal from the PES; and

(f) modifying the VCM control signal with the RV-FF, LVr-FF and LVc-FF signal. The disk drive of claim 1 wherein the disk drive includes a printed circuit board attached to the base and wherein the first, second and third vibration sensors are mounted on the printed circuit board.

8. The disk drive of claim 7 wherein there are three and only three vibration sensors.

9. The disk drive of claim 7 wherein each of the vibration sensors is a single-axis accelerometer.

10. The disk drive of claim 7 wherein the spaced-apart first and second vibration sensors are aligned along a line through said rotational axis.

11. The disk drive of claim 7 wherein the third vibration sensor has its sensitivity axis aligned along a line through said rotational axis.

12. The disk drive of claim 7 wherein the disk drive includes a printed circuit board attached to the base and wherein the first, second and third vibration sensors are mounted on the printed circuit board.

What is claimed is:

1. A magnetic recording disk drive comprising:

a disk drive base;

a spindle motor attached to the base and having a rotational axis;

a magnetic recording disk mounted to the spindle motor for rotation about said rotational axis;

a rotary actuator attached to the base;

a recording head attached to the actuator and movable across the disk in a generally arcuate path from a head inside diameter position (h_{ID}) to a head outside diameter position (h_{OD});

a first vibration sensor attached to the base and having a vibration sensitivity axis generally parallel to a radius from the spindle motor rotational axis to a head position between h_{ID} and h_{OD};

a second vibration sensor attached to the base, the second vibration sensor being spaced from the first vibration sensor and having a vibration sensitivity axis generally parallel to the vibration sensitivity axis of the first vibration sensor; and

a third vibration sensor attached to the base and having a vibration sensitivity axis generally orthogonal to the vibration sensitivity axis of the first vibration sensor.

2. The disk drive of claim 1 wherein the disk drive includes a printed circuit board attached to the base and wherein the first, second and third vibration sensors are mounted on the printed circuit board.

3. The disk drive of claim 1 wherein there are three and only three vibration sensors.

4. The disk drive of claim 1 wherein each of the vibration sensors is a single-axis accelerometer.

5. The disk drive of claim 1 wherein the spaced-apart first and second vibration sensors are aligned along a line through said rotational axis.

6. The disk drive of claim 1 wherein the third vibration sensor has its sensitivity axis aligned along a line through said rotational axis.

7. A magnetic recording disk drive comprising:

a disk drive base;

a spindle motor attached to the base;

a magnetic recording disk mounted to the spindle motor and rotatable about an axis, the disk having a plurality of concentric data tracks containing servo positioning information;

a recording head movable across the disk in a generally arcuate path from a head inside diameter position (h_{ID}) to a head outside diameter position (h_{OD}), the head being capable of reading data and servo positioning information in the data tracks;

a voice-coil-motor (VCM) attached to the base for moving the head;

first and second spaced-apart linear vibration sensors attached to the base and having primary axes generally parallel to a radius from the disk rotational axis to a head position between h_{ID} and h_{OD} for detecting rotational vibration about the disk rotational axis and linear vibration in the cross-track direction;

a third linear vibration sensor attached to the base and a having a primary axis generally orthogonal to the primary axes of the first and second vibration sensors for detecting primarily linear vibrations in the track circumferential direction;

a processor;

memory associated with the processor;

and a program of instructions stored in memory and readable by the processor for undertaking method acts comprising:

(a) receiving a digitized signal S1 from the first linear vibration sensor, a digitized signal S2 from the second linear vibration sensor, and a digitized signal S3 from the third linear vibration sensor;

(b) calculating a rotational vibration feedforward (RV-FF) signal from S1 and S2 representing the difference between S1 and S2;

(c) calculating a radial linear vibration feedforward (LVr-FF) signal from S1 and S2 representing the sum of S1 and S2;

(d) calculating a circumferential linear vibration feedforward (LVc-FF) signal from S3;

(e) calculating a VCM control signal from the PES; and

(f) modifying the VCM control signal with the RV-FF, LVr-FF and LVc-FF signal.

8. The disk drive of claim **7** wherein there are three and only three vibration sensors.

9. The disk drive of claim **7** wherein each of the vibration sensors is a single-axis accelerometer.

10. The disk drive of claim **7** wherein the spaced-apart first and second vibration sensors are aligned along a line through said rotational axis.

11. The disk drive of claim **7** wherein the third vibration sensor has its sensitivity axis aligned along a line through said rotational axis.

12. The disk drive of claim **7** wherein the disk drive includes a printed circuit board attached to the base and

wherein the first, second and third vibration sensors are mounted on the printed circuit board.