Honeywell Aerospace
Accelerometer Glossary of Terms

Bias
The accelerometer output with no input acceleration present. Bias is a signed quantity usually expressed in units of acceleration.

Composite Error
In general, any error that includes two or more sources; specific meaning is generated by naming the sources. Errors Sources are typically RSS'd to obtain composite error.

Cross Coupling Coefficients
The proportionality constants that relate variation in the accelerometer's output to products of acceleration in axes parallel and normal to the input axis.

- Kip produces an output proportional to the product accelerations in the input and pendulous axes.
- Kio for the input and output axes.
- Kop for the output and pendulous axes.

Damping Ratio
For a second order system, the damping ration, ZETA, is the ratio of the systems actual damping to its critical damping value. If damping is critical, the second order system has two real poles that are equal.

g
Unit of acceleration, equal to a standard value of gravity or an otherwise specified level. (Accelerometer specifications and data supplied by Honeywell use 9.80708 m/s^2, the constant at Redmond, WA.)

Noise
Undesired perturbations in the accelerometer output signal which are generally uncorrelated with desired or anticipated input accelerations. Noise in the accelerometer output is of two types: intrinsic and seismic.

- Intrinsic noise is generated within the accelerometer and represents the limiting factor in making measurements. Intrinsic noise is random in nature and is characterized by a noise power spectral density (PSD) curve.
- Seismic noise is a true input acceleration (usually unanticipated by the user). It results from noise sources in the local environment (running motors, seismic shocks, etc.) and their transmission to the accelerometer through the mounting structure which supports the accelerometer.

Non-linearity
The deviation of the accelerometer output from the input-output from a BFST (least square method) over the operating range. The deviation is expressed as a percentage of the full-scale output. Optional representation is to provide non-linearity coefficients: i.e., K2 (ug/g^2) and K3 (ug/g3).

Repeatability
The closeness of agreement among measurements of the same variable, repeated under the same conditions, especially when changes in conditions occur or when operation is interrupted between the measurements.

Scale Factor
The ratio of the change in output (in volts or amperes) to a unit change of the input (in units of acceleration); thus given in mA/g or V/g.

Sensitive Misalignments
The extent to which the accelerometer's true sensitive axis deviates from being perfectly orthogonal to the accelerometer's reference mounting surface when mounted to a flat surface using mounting screws torqued to 5 inch-pounds. Expressed in components of MIP (a rotation of the input axis about the ORA) and MIH (a rotation of the input axis about the PRA).

- ORA is the Output Reference Axis.
- PRA is the Pendulous Reference Axis.
- IRA is the Input Reference Axis.

All reference axes are based on the case mounting reference surface.

Sensitivity
The ratio of a change in response to a change in an undesirable or secondary input (as the scale factor variation to a unit of power supply voltage change).

Temperature Modeling
The process by which performance characteristics are measured over the operating temperature range and mathematically reduced to obtain a constant and coefficients for a multi-order model. The model is normalized to one temperature (typically 20°C). The application of the model to raw data is referred to as 'correction'.

Temperature Sensitivity
The sensitivity of a given performance characteristic (typically scale factor, bias, or axis misalignment) to operating temperature. Specified as worst case value over the full operating temperature range. Expressed as the change of the characteristic per degree of temperature change; a signed quantity, typically in ppm/°C for scale factor, ug/°C for bias, and urad/°C for axis misalignment. This figure is useful for predicting maximum scale factor error with temperature as a variable when modeling is not accomplished.

Vibration Rectification Coefficient (VRC)
A calculated number obtained by dividing the bias shift that occurs during vibration $(rms)^2$ value of the applied input vibration. Usually expressed in ug/g^2 units.

Vibration Rectification Error (VRE)
The apparent shift in accelerometer bias when subjected to sinusoidal or random vibration due to the accelerometers even order non-linearity. Usually expressed in mg or g units with a specified vibration applied.