A DESCRIPTION AND NOISE OF THE FTG GRAVITY GRADIOMETER

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The system is comprised of three gravity gradient instruments (GGIs). Each gravity gradient instrument contains 4 accelerometers mounted on a rotating platen. The accelerometers are mounted so that the individual accelerometer input axis is in the plain of the rotating platen, parallel to the circumference of the platen and separated by 90 degrees. The three GGIs are in turn mounted on an inertial stabilized platform.

Direct measurement of host vehicle accelerations are eliminated by frequency separation: where the gradient measurement is modulated at twice the wheel rotation frequency and any direct acceleration measurement due to slight imbalance of opposing pairs of accelerometers is modulated by one times the rotation frequency. This allows opposing pairs of accelerometers to be continuously and precisely balanced without disturbing the gradient measurement. Such balance is accomplished by demodulating the GGI output signal at the rotation frequency. The balance adjustment is accomplished by electrically changing the scale factor of one accelerometer in each accelerometer pair. The two GGI accelerometer pairs are separated by 90 degrees in the demodulated signal. Demodulating the GGI output at twice the rotation frequency derives the gradient signal. Each GGI provides two combinations of the six gradient components separated by 90 degrees of the demodulated twice rotation frequency.