

Inertial measurement unit improves GPS signal

Racelogic (United Kingdom) has introduced the IMU04. It is an inertial measurement unit (IMU) which provides measurements of pitch, roll, and yaw rate using three rate gyros, as well as x, y, z acceleration via three accelerometers.

WHEN IMU DATA IS INTEGRATED with the GPS signal from the company's VBOX3i data-logger it improves the quality of the speed and heading signals in areas of poor satellite reception – such as tree-lined roads – ensuring that testing is consistent even when conditions are not ideal. This integration also removes speed overshoot due to the roof mounting of the GPS antenna during brake tests. The 'lever-arm' effect is counteracted by combining the GPS signal with that of the IMU, mounted at the car's center of gravity. Using the introduced unit with a VBOX3i data-logger also provides high accuracy pitch and roll angle measurements, accurate to 0,1° (RMS).

The product was designed for use either as a stand-alone sensor with simple connection and configuration via the CAN interface, or for use with the company's VBOX GPS data loggers. The CAN based unit is temperature compensated and has improved calibration and stability.

The product is constructed with a splash-proof casing, which is IP67 rated, making it suitable for use on boats or in harsh environments, as well as automotive testing. The unit measures 76 mm x 64 mm x 29 mm, with a mounting flange. It uses synchronous 16-bit sampling for each of the internal sensors which provides accuracy, with yaw rate resolution of 0,014 degrees per second and acceleration resolution down to 0,15 mg.

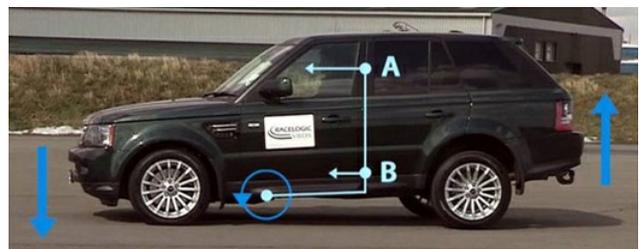
Brake Testing

Conducting brake tests on tall vehicles with long suspension travel can result in a speed overshoot of the velocity data, due to the measurements being taken at the high roof position of the GPS antenna. As the brakes are initially applied, there is a higher rate of change in velocity at the roof than there is at the vehicle's center of gravity (COG).

However, the integration of an IMU04 with a VBOX3i can be used to counteract this 'lever-arm' effect by placing the IMU at the COG, which measures the vehicle pitch as it brakes. This data, when combined with that from GPS, provides a compensation for the overshoot and allows for consistent brake stop testing.



(Photo: Racelogic)



(Photo: Racelogic)