A complete range of solutions for dynamic vehicle testing.

CORRSYS DATRON Sensorsysteme GmbH

APPLICATION NOTES:
Kalman filtering in GPS sensors: accuracy or deception?

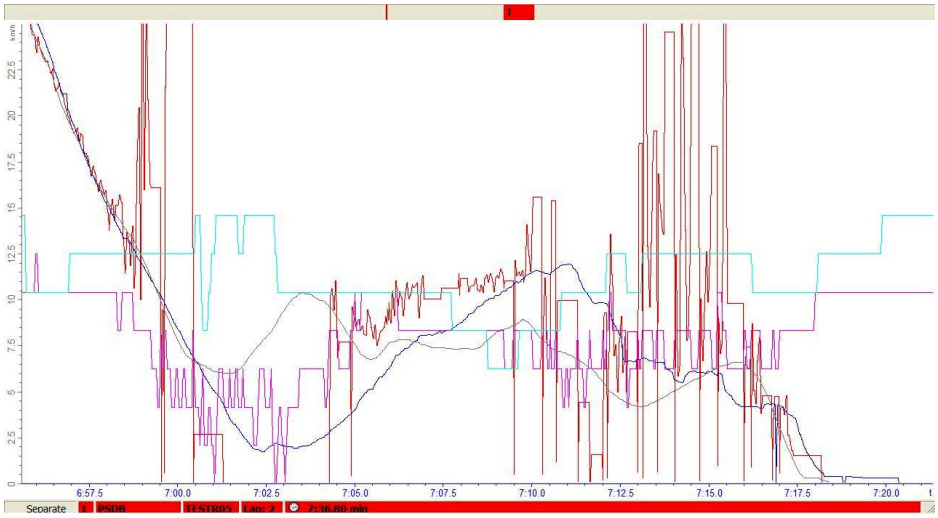
During a recent test at the Bruntingthorpe Proving Ground in England, we thought it would be interesting to compare two GPS based systems (the CORRSYS-DATRON MicroSAT GPS Sensor and another well-known GPS sensor) with a CORREVIT® Non-Contact Optical Sensor. Parked on the grounds of the testing facility was a 747 Jumbo Jet that we could drive under to find out how the GPS sensors would deal with line-of-sight obstructions.

As is widely known, the limitation of all GPS sensor is that they cannot function without a clear, unobstructed view of the sky. Any obstruction of line-of-sight availability to the satellite signals they require to compute position and velocity renders GPS sensors unable to function. The graph at the right is from this test and shows precisely when we drove under the aircraft's fuselage.

Of course, the optical sensor is not affected. As you can see, the velocity signal from the MicroSAT Sensor became noisy as it tried to re-acquire satellite signals. The Kalman filter-equipped GPS sensor appears to retain its connection with the satellite signals. Unfortunately, this is only because its integrated Kalman filter calculates measurement data during periods of signal loss. As a result, the Kalman-filtered GPS speed trace is obviously not representative of what actually happened in the test.

The idea behind the MicroSAT, from the very beginning, was to offer an additional sensor to expand our complete range of vehicle test systems. It has always been clear that GPS is not a miracle solution – despite what some manufacturers would lead you to believe. If there are no satellites in view (e.g., under bridges, in tunnels, or even under Jumbo Jets), the MicroSAT reports what is really happening, not a calculated approximation of the data actually acquired. We believe that you should know if there is a chance that the data you acquire is not valid. True data is always better than false data that has been artificially manipulated to look good!

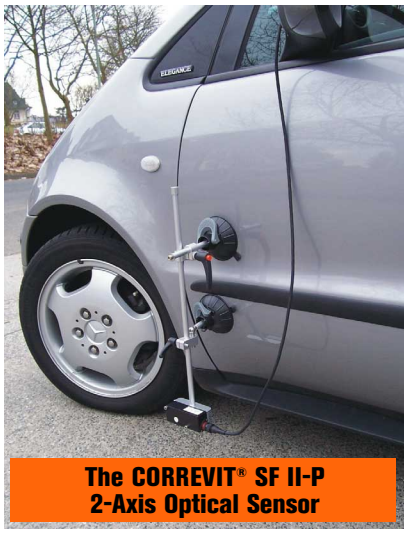
Based on these findings, we're compelled to ask a very important question. If you're not using a ground-based reference, how can you be sure you're getting accurate results?



Grey – CORREVIT® Optical Sensor, speed trace
Red – MicroSAT Sensor, speed trace
Pink – MicroSAT Sensor, satellite count
Dark blue – GPS Sensor with Kalman, speed trace
Light Blue – GPS Sensor with Kalman, satellite count

Now, as always, CORREVIT® Non-Contact Optical Sensors provide data you can rely on. And when you need GPS, rely on the MicroSAT GPS Sensor – the GPS sensor that gives you the truth, not an approximation.

Unlike some providers, CORRSYS-DATRON will never attempt to convince you that a single testing technology is capable of satisfying the demands of every application. This is simply not possible. Get the truth – and the testing solution that fits the demands of your application. Contact CORRSYS-DATRON today!



The CORREVIT® SF II-P 2-Axis Optical Sensor

For more information, please contact us today.

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