Pavement Management Services are proud to announce the arrival of our first 3D laser road profiling Automated Road Analyser (ARAN) capable of undertaking automated measurement of road surface conditions and geometry. This system achieves industry leading technology of where 1 pixel equates to 1 square mm on the road surface.

Laser Crack Measurement System (LCMS)

There has been significant advancement in the development of Automated crack detection for pavement condition over the past five to six years. For one such development, is the emergence of Laser Crack Measurement System (LCMS) developed by Pavemetrics and National Optics Institute (INO) in Canada.

The LCMS offers a key differentiator over other automatic crack detection techniques in that it is a 3D imaging system. This 3D system provides not only intensity data which other competing systems provide but also range data. The LCMS uses two high 3D laser profilers in order to achieve a vertical resolution of 0.5mm and lateral resolution of 1mm. It is the use of this range data in the automatic crack detection algorithms that has the greatest influence in reducing the number of false positives that any automatic method results in. The system is capable of automatically extracting crack data including crack type (transverse, longitudinal, crocodile) and severity. Due to the high resolution of the data the system is also capable of detecting automatically; ruts (depth, type), macro-texture (digital sand patch) and ravelling (loss of aggregates). This is over a 4 m width allowing study of edge break and drop off. Lesser systems are confined to 2 m studies between the wheelpaths and hence only report a representative sample.
Data Analysis

The LCMS unit can undertake a wide spectrum of defects simultaneously. It is this aspect which is proven as the greatest benefit to the clients and hence providing financial benefits. The diagram below illustrates how the various types of data collected by the LCMS system can be exploited to characterise many types of road features.

Detection of pavement cracking and surface distresses, transverse profile, rutting and macrotexture can all be collected using the Pave3D subsystem. The Pave3D system make use of high speed cameras, custom optics and laser line projectors to acquire both 2D images (black and white intensity images) and high resolution 3D profiles (surface elevations) of the road.

As a result this state-of-art system can reproduce a detailed image of a pavement’s surface which is ideal for the identification and rating of pavement distresses and surface texture.

The benefits of this when it comes to processing the data into meaningful pavement distresses is that automated pavement distress algorithms have a much easier job of calculating the extent and severity of pavement cracks and distresses. Therefore much more accurate and repeatable rating of pavement cracks will result from automated distress rating.