Pave3D System

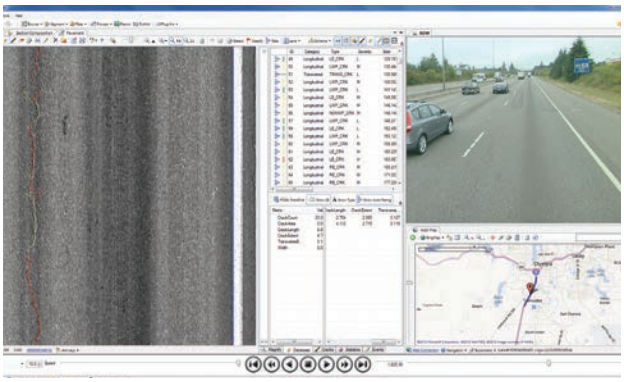
Pave3D system collects continuous 3D images of all types of road surfaces. This unique 3D vision technology allows for precise pavement condition measurement, day or night, up to highway speeds. The Pave 3D system has the highest transverse and longitudinal resolution, resulting in the best quality pavement condition measurements.

Fugro Pave3D System: Fugro's Pave 3D system creates a detailed 3D model of the road surface. This 3D technology allows for fully automated pavement condition assessment of both asphalt and concrete surfaces over 13 feet (4m) in width the day or night at speeds up to 62 mph (100 km/h).

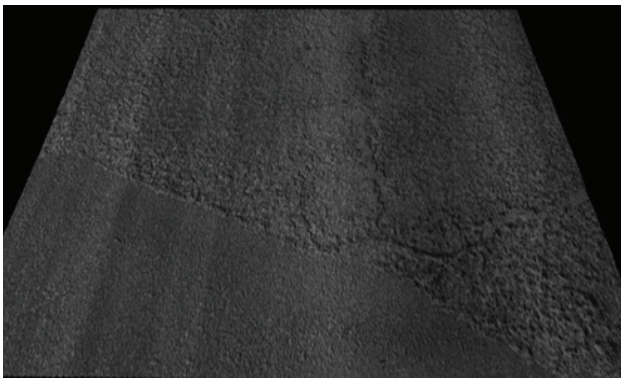
Crack Detection: Cracking and other distresses are extracted from the 3D profile data. The system uses depth information for each crack to know for sure if the crack has depth compared to the road surface. This significantly reduces false positives, and greatly increases the reliability and repeatability of the automated detection results from the Pave3D system.

Pave3D Texture: Full lane width texture using the five AASHTO bands. The Pave3D sensor measures texture using standard MPD and a Digital Sand Patch Model (ASTM E965). The Digital Sand Patch Model is calculated using the Road Porosity Index (RPI). The RPI is defined as the volume of the voids in the road surface that would be occupied by the sand (from the sand patch method) divided by a surface area. The digital sand patch model allows texture to be evaluated continuously over the complete road surface instead of measuring only a single point inside a wheel path enabling accurate detection of raveling and bleeding.

ARAN 9000



Vision Software



Pave3D Image

Pave3D System

Crack Classification and Rating: The detected cracks are analyzed using Fugro's Vision software that includes pattern recognition algorithms to determine the types of distresses (longitudinal, transverse, alligator cracks, etc.). Cracking data can then be reported according to the client's distress manual, by roadzone, severity level and by aggregating the data to determine length of cracking, width, number of cracks, area of cracking, and extent (length of road affected).

Rutting: Pave3D delivers the highest resolution road surface transverse profile that can be attained on the market today. It utilizes its industry leading 4,000+ points of transverse resolution one point every 1mm (0.04") across a full lane width 4m (13 feet) to create a detailed transverse profile for rutting calculations.

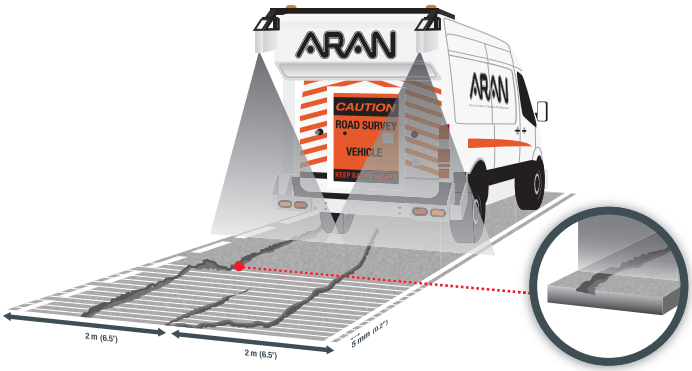
Pave3D has been field tested to accurately record rut depth measurements to within +- 1mm (0.04") as compared with precision straight edge rod and level surveys. The system conforms to all AASHTO and ASTM standards.

Fugro's algorithms allow the data to compare historically to rut bar or other laser scanning systems. This ensures that the historical data, which represents a significant investment for an organization, can be kept for future referencing.

Key Features:

- Crack detection and severity
- Rutting (rut depth, rut type) 4,160 point
- Full lane macro-texture measurements (MPD)
- Pot holes
- Patching
- Raveling
- Sealed cracks
- Joints in concrete
- Tinning
- Digital sand patch

3D Sensor Working Principle



Specifications

Vehicle Speed (Max):	62 mph (100 km/h)	50 mph (80 km/h)
• Sampling rate	5,600 profile/s	11,200 profile/s
• Profile spacing	5mm (0.2")	2.5mm (0.1")
• 3D points per profile	4,096 points	4,096 points
• Transverse field-of-view	4m (13 feet)	4m (13 feet)
• Depth range of operation	250mm (9.8")	250mm (9.8")
• Z-axis (depth) resolution	0.5mm (0.02")	0.5mm (0.02")
• X-axis (transverse) resolution	1mm (0.04")	1mm (0.04")

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