

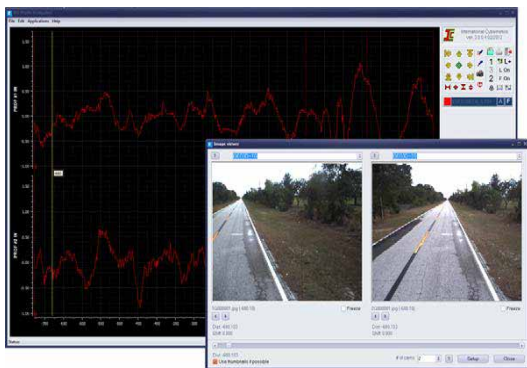
# INTERNATIONAL CYBERNETICS CORPORATION'S AUTONOMOUS ROAD PROFILER ROADBOT USES GOCATOR FOR HIGH-PRECISION PAVEMENT PROFILING

ICC supplies its customers with high-quality hardware and software to meet their data collection needs — offering a wide selection of products that are ideal for use in pavement management, asset and sign inventory, mobile mapping, construction quality control, and design and build estimation.

## ABOUT THE CLIENT

Since 1975, International Cybernetics Corporation (ICC) has been manufacturing non-destructive test equipment for the governmental and consultancy industry. ICC has established itself as one of the industry leaders for its products. It has successfully negotiated and received contracts for its products around the world.

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ICC Profiler Evaluation Viewer

## The Challenge

Vehicular and walking road profilers are subject to measurement errors such as acceleration noise affecting inertial instruments, and errors caused by tilting of the instruments in the transverse direction.

Based on these challenges, ICC identified an opportunity to design a robotic inspection solution that can autonomously generate benchmark quality 3D road profiles despite variations in road surface conditions.

## The Solution

ICC's solution is a new autonomous robotic profiler that produces high-precision, high-resolution road profiles using a patented dual line laser method.

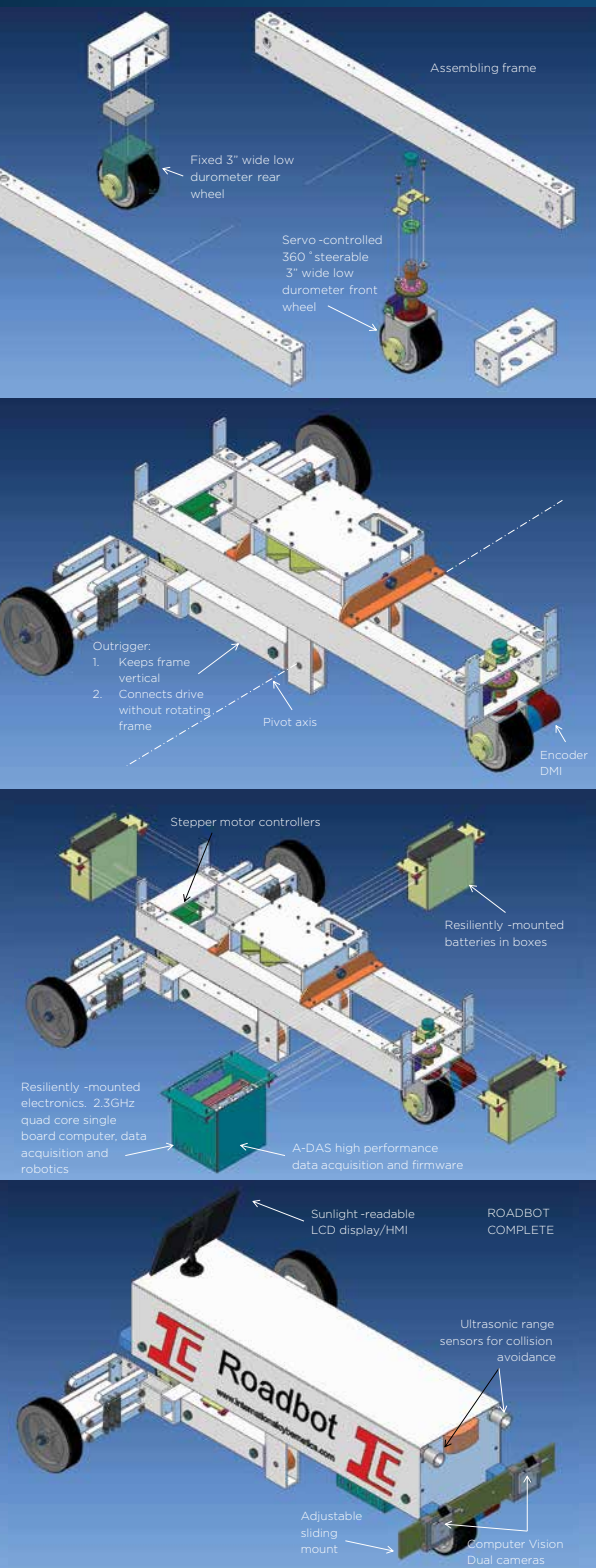
The profiler, called "Roadbot", uses two LMI Gocator 2342 line lasers in combination with several inertial instruments to generate a highly accurate profile with short waveband extending to 3" (76mm). The Roadbot profiler uses tire bridging filters to emulate vehicle tire behaviour and orients the lasers in such a way that the profiler is immune to longitudinal and transverse textures resulting from tining or grinding.

Profiles generated by Roadbot are unfiltered, similar to the rod and level method, with highly accurate end elevations. Roadbot is driven by electric motors and uses servos (small devices that outputs a coded signal) for computer vision steering and control of the platform, which mounts the lasers and inertial instruments.

Roadbot follows the profile markings on roads (such as chalk line or string line) without the need for operator intervention. Radio beacon and other guidance techniques will eventually be added to the solution for maximum flexibility.



Dual Line Laser Benchmark Road Profiler



“Gocator was amazingly cost-effective and easy-to-integrate into our road profiling system. Its 3KHz scan speed and real-time, high-precision data capture capabilities delivered the performance we required for generating short waveband, closed loop road surface profiles.”

## The Results

Roadbot autonomously generates multiple closed loop profiles, turning 180 degrees at the ends of the profile line using a specialized technique that immediately produces PPF and ERD profiles as a result of the scanning process.

Using an ultra-stable constant speed drive, Roadbot solves the challenge of acceleration noise affecting inertial instruments in walking profilers. This stability also prevents errors caused by tilting of the instruments in the transverse direction.

Finally, Roadbot detects distance calibration targets that can be placed at intervals of approximately 100 feet beside the profile line and auto-calibrates the Distance Measuring Instrument (DMI) for high accuracy, which is essential for the cross-correlation of profiles in the short waveband extending down to 3" (76mm).

To learn more about Gocator All-In-One 3D Smart Sensors, please email [contact@lmi3d.com](mailto:contact@lmi3d.com)

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