YonaPMS INTERNATIONAL LTD

Pavement & Transportation Asset Management Video-GIS Referenced Systems

YonaPMS INTERNATIONAL LTD   YONA Engineering Consulting & Management Ltd   MACABIM Roads and Structures Engineers LTD
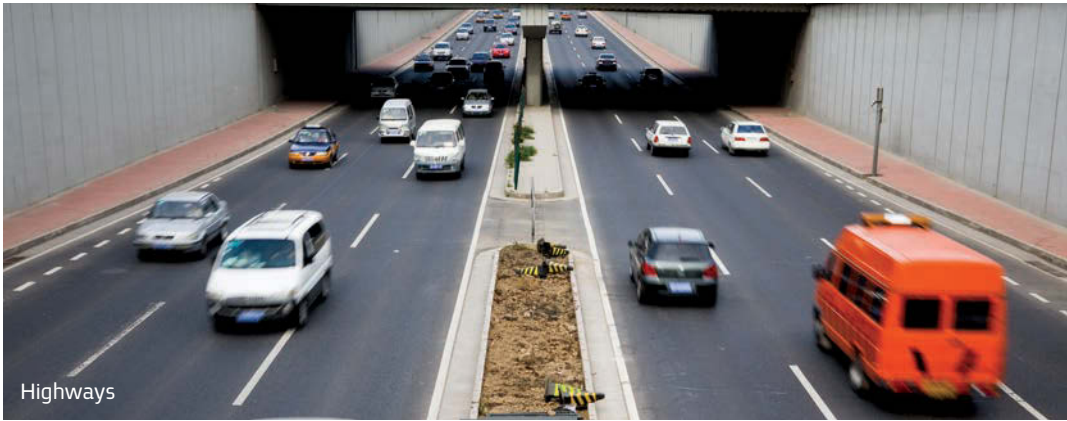
We are all in a state of constant motion, continually transporting ourselves and our belongings from one location to another – by foot, by car, by bus, by train, and by plane. Likewise, there is an ongoing movement of goods, with eighty-five percent of all cargo being transported via the world's highways.

In contrast to the days when we rode horses through wild terrain, today we expect safe and comfortable roads, smooth pavement, clear road signs, strong guardrails, adequate lighting, and many other features that safeguard our travels.

Those entrusted with the management of transportation facilities are faced with the complex task of gathering up-to-date information regarding the condition of our roads - and determining the maintenance priorities among the many elements that have been worn by the passage of time and traffic - utilizing their often insufficient budgets to ensure our smooth and safe journeys.

Responding to these needs, and based on their own field requirements, the Yona Group has developed YonaPMS - a sophisticated, end-to-end Pavement & Transportation Asset Management Video-GIS Referenced System.

Highways

Urban Areas

Airports

Railways

YonaPMS

YonaPMS is a comprehensive, modular, fully customizable solution that enables the systematic and cost-effective management, maintenance, rehabilitation, and long-term planning related to all aspects and features of pavements and roadways.

The system - which enables sensitive data to remain in-house - collects, integrates, analyzes, and evaluates high-resolution spatial video data and Geographic Information Systems (GIS). It generates asset inventories and condition assessments, compares historical video databases, and creates detailed customized reports - transforming a massive amount of data into effective decisions and multi-year plans. **YonaPMS** enables decisions and administrative tasks to be accomplished quickly and efficiently by placing critical, previously unavailable information at every manager's fingertips.

YonaPMS was designed for use with digital camera arrays that can be mounted on existing vehicles. Hardware and software can be purchased as required, and easily added or removed. With **YonaPMS,** there is NO need to purchase or lease costly vehicles, and NO need to use components that don't meet current needs.

The **Yona Group** provides full onsite training in the use and maintenance of the system. The company also offers ongoing support as well as implementation services, all tailored to each customer's evolving requirements.

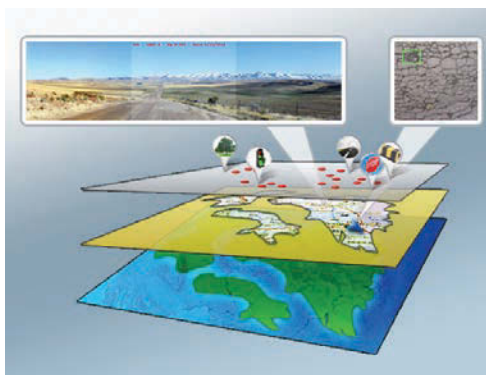## An End-to-End Pavement & Transportation Asset Management GIS Video-Based System

- Modular, Integrated, Scalable, Flexible, Customizable
- Usable on any Existing Microvan or Pickup Truck
- Designed for ALL Pavements, Streets, Roadways, Airports, Railways, Sidewalks, Urban Infrastructures

Enables decision-makers to

- Manage & control all aspects of pavement & transportation asset maintenance
- Optimize planning on a yearly or multi-yearly basis
- Maximize budget utilization
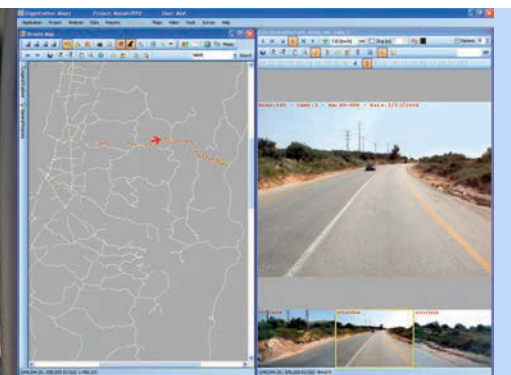- Ensure safe, continuously improved streets & highways

Multi-functional data collection system mounted on vehicle

Information Layers

Mobile Station

YonaPMS.Viewer

YonaPMS Modules

YonaPMS is a modular system designed to ensure convenience, flexibility, scalability, and cost-effectiveness. The system is composed of the following four modules:

■ Field Data Collection/Integration [**YonaPMS.DataIntegrator**]

■ Inventories/Condition Surveys/Analysis [**YonaPMS.Analyzer**]

■ Financial and Work Plans [**YonaPMS.Planner**]

■ Reports/Archives [**YonaPMS.Reporter**]

These four modules can be purchased together as a complete, comprehensive system - or can be ordered separately as standalone solutions - depending on current budgets and evolving requirements.

Module One — Field Data Collection/Integration (YonaPMS.DataIntegrator)

YonaPMS.DataIntegrator utilizes camera arrays and additional components to collect updated information regarding road conditions. These components are connected to a PC network that enables data storage and real-time location information. Camera operators view high-resolution videos of road conditions and features, and can make on-the-fly adjustments as required.

YonaPMS supports 3 or more front digital color video cameras that deliver a panoramic view of the roadway while the vehicle travels at up to 100 km/h under normal driving conditions. These cameras capture video of assets such as guardrails, slopes, posts, lights, signs, signals, gas stations, and bus stops. Two rear cameras are supported, with pictures stitched together to create a mosaic of any selected length, by lane width of up to 4.10m. Measurements include linear and areal features. Side cameras can be added to capture telephone poles, street lights, retaining walls, etc. Data is presented in tables and GIS-referenced maps.

The **YonaPMS.DataIntegrator** enables the viewing of captured video, and positions user-selected points in a geo-referenced coordinate system within a GIS environment. A Video Recording System controls the data collection. A DMI (Distance Measurement Instrument) triggers the cameras as the vehicle travels at a pre-determined speed, and enables the geo-referencing of the data. A Sub-Metric GPS (Global Positioning System) enables the creation of a GIS-referenced map that can be layered with various infrastructure data. A Geometric Gyro Tool, positioned at the center of the vehicle, contains gyroscopes that determine the vertical and horizontal slopes and curves of the roadway. A Laser Rutting Measurement System (LRMS) - developed by INO, a world leader in laser measurement devices - measures an accurate cross-section profile of the pavement to determine rutting values. A Laser Roughness device measures the longitudinal profile of the pavement to calculate the International Roughness Index (IRI).

Front Cameras

Geometric Gyro

Rutting Tool

Mobile Station

Non-dedicated vehicle, mounted with field data collection tools

Rear Camera

GPS

DMI

Roughness Tool

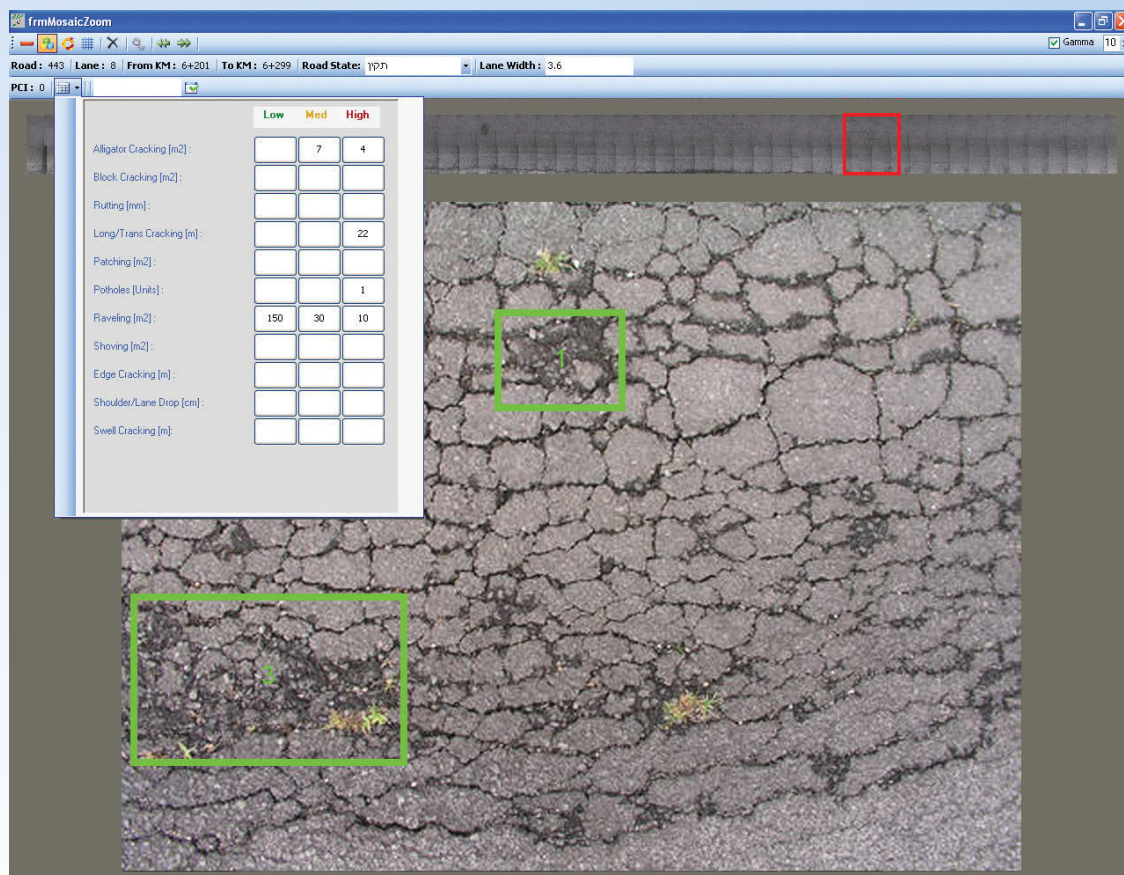# Module Two – Inventories/Surveys/Analyses (YonaPMS.Analyzer)

In order to become useful and actionable, the massive amount of data collected via **YonaPMS. DataIntegrator** must be effectively managed and controlled – and put into an easily understood, flexible, customized format.

YonaPMS.Analyzer creates accurate roadway inventories and condition surveys by measuring width, length and height of roadway assets, calculating the area, and producing damage surveys.

The fully customizable **Survey Form Generator** creates specific inventory or condition forms and allows adjustment of survey parameters.

The **3D Measuring Tool** enables the precise measurement of horizontal and vertical elements.

The **Mosaic Manager** stitches together roadway pictures, creating a continuous mosaic.

The **PCI (Pavement Condition Index)** – developed by the US Army Corps of Engineers – evaluates pavement distress and calculates condition indexes.
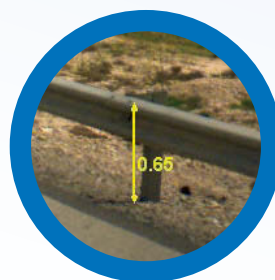
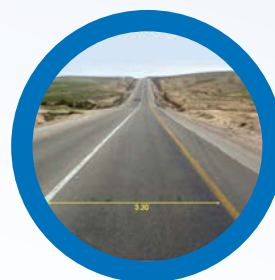

PCI Measurement and Calculation

Area & Coordinates of Pothole Repair
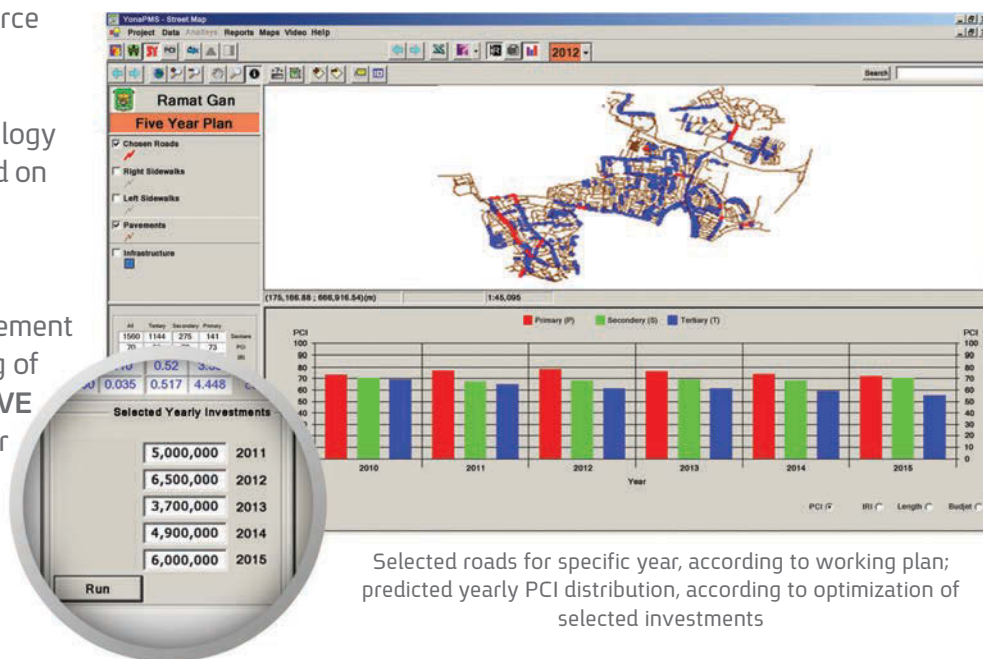

Vertical Ruler

Vertical Measurement

Horizontal Measurement

Signage Survey

Module Three — Financial & Work Plans (YonaPMS.Planner)

In order to ensure maximum budget optimization, decision-makers need detailed, long-term financial and work plans - based on accurate, comprehensive, and up-to-date information. **YonaPMS.Planner** simplifies these tasks with a set of fully customizable, easy-to-use **TAM** (Transport Asset Management) programs, each designed for a specific asset class: **Streets** and **Sidewalks, Urban Facilities, Highways, Airports,** and **Railways**. The system was designed and developed by experienced pavement engineers who are familiar with financial and work plans as well as advanced engineering solutions. These tools provide maintenance and rehabilitation solutions including customized cost estimates, according to individual criteria. The Planner includes a modular, customizable **Decision Tree** consisting of a hierarchal series of decisions that determine all issues regarding roadway networks. The Tree helps create, develop and maintain a budget and work plan for multiple parameters across networks, and enables multi-year plans to maximize budget effectiveness and stretch scarce funding. The Yona Group's pavement engineers have developed a unique methodology for pavement evaluation based on FWD deflection testing - **YONAPAVE** - which can be adapted for preparation of engineering solutions for pavement overlay and the strengthening of pavement structure. **YONAPAVE** is utilized without the need for core drilling to determine pavement thickness.

Selected roads for specific year, according to working plan; predicted yearly PCI distribution, according to optimization of selected investments

Module Four — Reports/Archives (YonaPMS.Reporter)

The Reporter is an essential tool for transportation asset managers, enabling the accumulation and organization of historical and current data, and providing a platform for leveraging the data. The Reporter can be used for comparing past and current road conditions and deterioration - and recording details about repairs as well as the contractors involved in the repair, materials used, and costs. The tool can also record complaints, compile statistics of areas causing complaints, and determine specific areas' proportional use of budgets over time. The solution displays the data on a GIS map, integrating tabular and graphical data in a GIS environment, and is exportable to Excel, Word, and other popular programs. Video databases can be attached to the Reporter to show simultaneous, synchronized videos of any feature along the network at pre-selected times in the past, thus providing an unparalleled tool for historic comparisons. This Module can also be used for quality control and quality assurance purposes for work done on pavement and shoulders.

Before

After

Table of Products and Services

Modules	Products	Services
Module One Field Data Collection/ Integration **(YonaPMS. DataIntegrator)**	■ Front Video Camera System ■ Rear Video Camera System ■ Side Video Camera System ■ YonaPMS.Video Recording System ■ YonaPMS.Viewer ■ DMI: Distance Measurement Instrument ■ Sub-Metric GPS ■ Geometric Gyro Tool ■ Laser Roughness Measurement Tool ■ Laser Rutting Measurement Tool	Collecting Field Data using Multi-Camera Panoramic Video, Pavement Surface Rear Video, including measurement of Rutting and Roughness, Geometric Mapping, Building GIS Maps, Image Adjustment to Geographic Location, Training & Support
Module Two Inventories, Surveys, Analysis **(YonaPMS.Analyzer)**	■ YonaPMS.Analyzer ■ YonaPMS.Analyzer. 3D Measuring Tool ■ YonaPMS.Analyzer. Forms Generator ■ YonaPMS.Analyzer.Video Manager ■ YonaPMS.Analyzer.Mosaic Tool ■ YonaPMS.Analyzer.PCI	Pavement Condition Analysis, Positioning and Mapping of Roadway Elements including Guardrails, Slopes, Roadway Paint Markings, Signs & Roadway Obstacles, Gas Stations, Bus Stations, Sidewalks, Bridges, Culverts & Ditches, Traffic Lights and Other Lighting, Other Roadway Elements as needed
Module Three Financial & Work Plans **(YonaPMS.Planner)**	■ YonaPMS.Planner. Streets & Sidewalks ■ YonaPMS.Planner.Highways ■ YonaPMS.Planner.Urban Facilities ■ YonaPMS.Planner.Airports ■ YonaPMS.Planner.Railways ■ YONAPAVE ■ Decision Tree ■ Working Plan ■ Financial Plan	Preparation of Decision Trees according to Customer Priorities, Creation of Work Plans & Financial Planning for Streets & Sidewalks, Urban Utilities: Sewer, Water, Drainage, etc., Highway Networks, Airport Networks, Railway Networks, Structural and Functional Evaluation & Overlay Design for Streets, Highways and Runways, Road Networks and Budget Optimization
Module Four Reports and Archives **(YonaPMS.Reporter)**	■ Reporter	Archive Surveyed Data, Calibrate Deterioration Models, Archive Historical Maintenance Data, Compile Complaint Statistics, Quality Control and Quality Assurance

Services

The **Yona Group** provides a full range of services for customers around the globe, including on-site and remote training - provided by the company's highly skilled teams of experts - who have amassed extensive experience in project management and in all aspects of product installation, use, and maintenance. The company offers ongoing, 24/7 online support for all its products, on a monthly or annual basis.

Customized, on-site implementation services are available — using the YonaPMS system, and based on specific customer requirements. Please see the Table of Products and Services for a list of offered services related to each of the four Modules. In addition, the Yona team is available to perform any required annual measurements of regional and national roadways.

The company provides comprehensive Compliance services for municipalities and government agencies, and can issue full Compliance Reports that detail concessionaire compliance with government contracts.

Brazil

Peru

Nigeria

Israel

Israel

Israel

About the Yona Group

Established in 1992, the **Yona Group's** engineers have amassed decades of experience in pavement engineering, materials technologies, and infrastructure projects. The company's sophisticated line of products was developed by its dedicated team of roadway engineering experts in response to the pressing needs of the market. Based on ongoing input from their international customer base - as well as the requirements of their own field work - the Yona Group delivers an unparalleled level of information-gathering products, services, and support - designed to assist transportation managers to make efficient and effective decisions that maintain safer roadways, optimize their budgets, and simplify their daily work.

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