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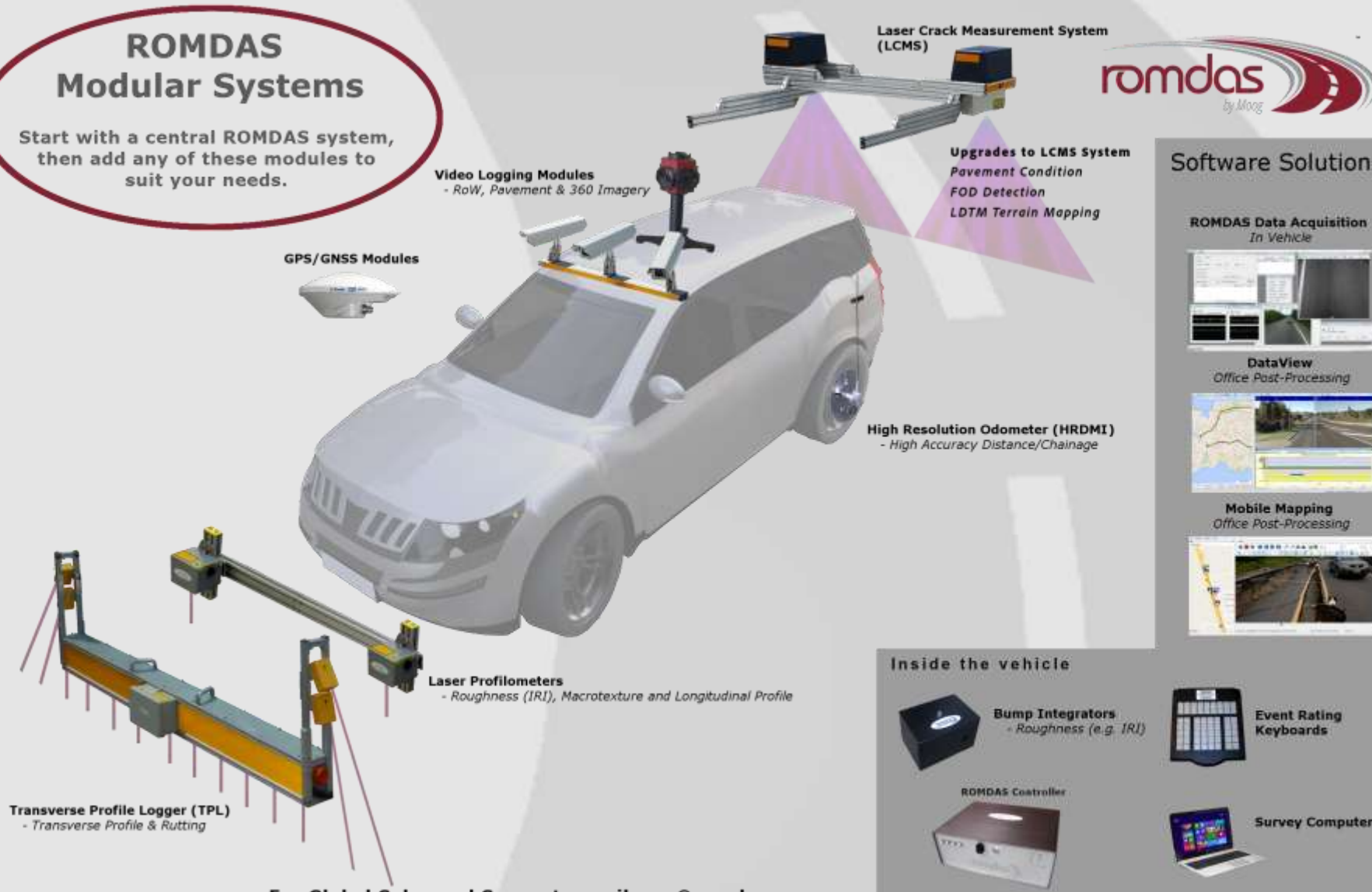
ROMDAS Guidelines:

Customizing A System & Common Configurations

ROMDAS Modular Systems

Start with a central ROMDAS system, then add any of these modules to suit your needs.



Software Solutions

ROMDAS Data Acquisition
In Vehicle

DataView
Office Post-Processing

Mobile Mapping
Office Post-Processing

Inside the vehicle

Bump Integrators
- Roughness (e.g. IRI)

Event Rating Keyboards

ROMDAS Controller

Survey Computers

For Global Sales and Support, email sms@romdas.com

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Designing A ROMDAS System

ROMDAS CAN BE USED FOR...

- Project or network level road surveying,
- Roughness surveys,
- Transverse profile/rutting surveys,
- Macro-texture (MPD),
- Visual condition or event rating,
- Automatic crack and surface defect detection,
- Location referencing (spatial GPS/GNSS data or linear LRP data),
- Video logging surveys (right of way, 360 and pavement view),
- Mobile mapping of roadside assets & inventory,
- Road geometry surveys,
- Travel time and congestion surveys,
- iRAP road safety surveys.

COMMON CONFIGURATIONS

For those new to high-speed road surveying, we have compiled some common configurations to help start the process. These configurations can be further customized depending on the needs of the user.

- ◊ **Entry Level Roughness & GPS**
- ◊ **'Any Condition' Roughness**
- ◊ **Consultant Friendly System**
- ◊ **Cost Effective Network Survey System**
- ◊ **State-Of-The-Art Network Survey System**
- ◊ **Dedicated Mobile Mapping System**
- ◊ **Dedicated iRAP Survey System**

ROMDAS® (**RO**ad **M**easurement **D**ata **A**cquisition **S**ystem) is a comprehensive, low cost and modular system for collecting asset and pavement information. The flexible design, which allows for installation on almost any local vehicle, has seen ROMDAS implemented in over 60 countries.

Whether a private consultant, government department or research institution, ROMDAS offers great reliability, flexibility and ease of use for anyone who needs to quickly and accurately collect asset data.

TIPS FOR DESIGNING A ROMDAS SYSTEM

Thanks to the modular design ROMDAS can be easily configured to suit the specific needs of users. To ensure you select modules that best suit your needs, consider the following questions;

1) **What type of data do I need to collect?**
   e.g. Roughness, Rutting, Cracking, RoW Video, Assets, Road Geometry etc...
2) **What type of roads do I need to survey?**
   e.g. Good Highways, Unpaved/Rough or a mixture of both
3) **What is my approximate budget?**

Knowing the answers to these questions will help determine the most appropriate modules. If you are still unsure which modules would best suit your needs simply email us the answers to the above questions and we can recommend a suitable configuration.

HOW TO USE THIS GUIDE

Step 1) Select A Central System
Select either a full ROMDAS or a MiniROMDAS system. The miniROMDAS is a streamline system that uses a handheld data-logger and is only compatible with the Bump Integrator to collect Roughness (IRI) data. All other modules must be used with a full ROMDAS system.

Step 2) Select Add-On Modules
Choose a combination of modules and software that include the features and data outputs you need.

Step 3) Select Optional Post-Processing Software
Additional post-processing software is optional, however ROMDAS offers several post-processing packages which can greatly enhance the data collected.

Step 4) Email Us Your Configuration & Receive A Quote
Send the list of components to sales@romdas.com and receive a quotation.

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Step 1:

Select A Central System

A central system is required for all vehicle mounted survey systems. The ROMDAS system is the more comprehensive option as it is compatible with all ROMDAS modules. Whereas the MiniROMDAS is a streamline option compatible with only GPS and Bump Integrator. The MiniROMDAS is very cost effective and ideal for users needing to collect road roughness but may only have limited budgets. For customers who want to utilize other modules and collect a wider variety of data (e.g. rutting, geometry, video logging, cracking etc…), then they must select the full ROMDAS system option.

The MiniROMDAS can upgrade to a full ROMDAS system at any time in the future.

Features		ROMDAS System	MiniROMDAS (Currently Not Offered Due To Parts Unavailability)
General	Includes power supplies, hardware interfaces, data collection and processing software.	✓	✓
	Survey computer	Laptop or PC (Windows)	Hand-held Pocket PC
	Upgradable with additional modules at any time	✓	
	Real-time status display of all modules during surveys,	✓	✓
	User Defined Event & Condition Rating (Keycoding)	✓	
	Predefine survey definitions	✓	
	iRAP accredited	✓	
Data Compatibility	Non-proprietary file formats. Inc. .MDB, JPEG, AVI. (exportable to .CSV, Excel, MS Word…)	✓	✓
	Data compatible with HDM4 and other commonly used Pavement Management Systems (PMS)	✓	✓
	Data compatible with ArcGIS & other common GIS mapping software	✓*	✓*
Compatible with following ROMDAS add-on modules	High Resolution DMI (HRDMI)	✓	
	GPS Receivers	✓	✓
	Bump Integrator	✓	✓
	Laser Profiler (Roughness & Macrotexture)	✓	
	Transverse Profile Loggers (TPL)	✓	
	Right Of Way (ROW) Video Cameras	✓	
	Pavement View Video Cameras	✓	
	360 Degree Camera with Mobile Mapping Features	✓	
	Road Geometry Unit	✓	
	Laser Crack Measurement System (LCMS)	✓	
	Event Rating Keyboards	✓	
Outputs (minimum)	Survey ID and description,	✓	✓
	Date and time of survey	✓	✓
	Vehicle and operator IDs	✓	✓
	Lane and direction (increment/decrement)	✓	✓
	Distance/speed	✓	✓
	4 user defined fields	✓	
Location Referencing (Linear & Spatial)	Real-time Sub-meter GPS accuracy Option Available	✓**	
	Conduct GPS center-line surveys *	✓*	✓*
	Reference GPS to other data sets*	✓*	✓*
	Location Reference Points (LRP) e.g. Km stones/posts	✓	
	Chainage referenced data,	✓	✓
	GPS Coordinate Converter (650 local datum available)	✓	✓

* When connected to a GPS receiver
**** When connected to a DGPS receiver and signal**

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Step 2

Select Add-On Modules

Features		ROMDAS Modules									
		High Resolution DMI	Bump Integrator	Laser Profilometer (Single or Double Lasers)	LCMS (Laser Crack Measurement System)	Transverse Profiler Logger (TPL)	ROMDAS Geometry Unit	ROW Cameras	360 Degree Camera with Mobile Mapping Software	Pavement View Cameras	GPS Receivers
Longitudinal Profile & Roughness	Raw Longitudinal Profile			✓	✓**						
	International Roughness Index (IRI)		✓	✓	✓**						
	World Bank Class 1 Roughness Device			✓	✓**						
	World Bank Class 3 Roughness Equipment		✓								
	ASTM 950 compliant			✓	✓**						
	User Defined Roughness Intervals		✓	✓	✓**						
	Recommended for Rough, Wet & Unpaved Roads		✓								
Transverse Profile And Rutting	Raw Transverse Profile				✓	✓					
	Rut Depth (Straight Edge Simulation)				✓	✓					
	Shoving				✓						
	Rut width				✓						
	Rut cross sectional areas				✓						
Macrotexture	Mean Profile Depth (MPD)			✓**	✓						
	Estimated Texture Depth (ETD)				✓						
	Road Porosity Index (RPI - digital sand patch)				✓						
	Macrotexture Across full Lane Width				✓						
Road Geometry	Cross-Slope/Fall (%)				✓**		✓				✓**
	Gradient (%)				✓**		✓				✓**
	Radius of Curvature (m)				✓**		✓				✓**
Automated Crack & Defect Detection	Automatic Crack Detection (Location, Length, Width, Depth , Type, Sealed Cracks.)				✓						
	Automatic Pothole Detection (Location, Depth & Area)				✓						
	Curb/Drop Off Detection				✓						
	Ravelling Index (RI)				✓						
	Concrete Joints and Faulting				✓						
	Water Pooling Depth				✓						
Video Logging & Mobile Mapping	Right of Way (ROW) Imagery (assets)							✓	✓		
	Pavement View Imagery (condition)									✓	
	Pavement View using Laser Imaging for Day or Night Operation (condition)				✓						
	360 Degree Imagery								✓		
	Compatible With Mobile Mapping Software							✓	✓	✓	
	Standard .AVI or .JPEG Output				✓			✓	✓	✓	
	Customizable Image Overlay				✓			✓	✓	✓	
	User Defined Trigger Distance				✓			✓	✓	✓	
Location Referencing	High Accuracy Distance/Chainage	✓									
	Results References with GPS Positions (inc. real-time sub-meter accuracy)										✓
Other	Recommended operating speed (km/h)	0-100	10-100	20-120	0-100	0-120	0-100	0-100	0-100	0-100	0-100
Where Equipment Is Installed	Vehicle Roof				✓			✓	✓	✓	✓
	Front/Rear Bumper			✓		✓					
	Inside Vehicle		✓				✓				✓
	Wheel	✓									

* When connected to a GPS receiver
**** LCMS and/or GPS Upgrade available**
***** Cracking, Potholes and other pavement defects**

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Step 3

Select Post-Processing Software

Features		ROMDAS Post Processing Software	
		DataView	Mobile Mapping Software
Data Management	Integrate Multiple Survey Files into a Single Database	✓	
	Rubber Banding Survey Length	✓	
Video Rating	Extract Visible Assets & Condition Data Directly From Videos	✓	✓
	Record Measurements From Images	✓	✓
	Simply Image Calibration (can to performed post-survey)	✓	✓
GIS Mapping	Create GIS Map Layers of Survey Data	✓	
	Exportable to 3rd Party GIS Software. Inc. Shape Files (ESRI/ARCGIS), MapInfo, KML (Google Earth)	✓	
	Import existing Road & Asset GIS Layers	✓	
Data Presentation/QC	Synchronized Viewing of All Survey Data (Inc. videos, GIS Maps and Charts)	✓	
	Custom Graphing of Survey Data (exportable as JPEGS)	✓	
	Export Custom Reports	✓	
iRAP Coding	Accredited Software for iRAP Coding	✓	
Mobile Mapping	Calculate Accurate GPS Coordinates of Assets Directly From Videos		✓
	360 degree immersive viewing (Similar to Google Street View)		✓
	Stitch Multiple Images And Export		✓
	Dynamically Edit GIS Layers Overlaid onto Videos		✓
Licensing Options	Licensing Options	Single Seat & Enterprise Options Available	Single Seat & Web Browser Options Available

Step 4

Send Us Your Configuration & Receive A Quote

Once you know which products you want for your survey system. Email us at sales@romdas.com to receive a quote. If you're still unsure which products would be suit your needs please feel welcome to email us for some advice. Our staff are always happy to help.

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Common Configuration

Entry Level Roughness & GPS

RECOMMENDED FOR:

- Government departments or consultants who have limited budgets and only need to collect roughness (IRI) and GPS data.
- Surveying unpaved, rough or rural roads where laser equipment cannot be used.

KEY BENEFITS:

- Exceptional price for World Bank Class 3 roughness device,
- Scalable by adding new modules as required in the future,
- Proven technology utilized worldwide,
- Easy to use interface,
- Can be installed with minimal time and vehicle modification,
- Use ROMDAS keycoding feature to perform visual condition and asset inspections while surveying,
- All data referenced with chainage and GPS coordinates.

INCLUDES:

- Central ROMDAS system,
- Single or dual Bump Integrators,
- GPS receiver,
- Survey laptop and vehicle mount.

SUGGESTED UPGRADES:

- ROMDAS Z250 Reference Profiler for setting up Bump Integrator calibration sites,
- Right of Way (ROW) video logging camera.

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Common Configuration

'Any Condition' Roughness

RECOMMENDED FOR:

- Users who require high accuracy roughness data, but need to survey a range of very good to very poor pavement conditions.

KEY BENEFITS:

- Minimize costly downtime due to weather and environmental conditions by utilizing Bump Integrator data in wet or very rough conditions where lasers are not suited,
- Bump Integrators can be rapidly calibrated using the Laser Profilometers,
- Complies with widely accepted ASTM and World Bank standards for collecting roughness data,
- Scalable by adding new modules as required in the future,
- Can be easily installed on locally supplied vehicles,
- Use ROMDAS keycoding feature to perform visual condition and asset inspections while surveying,
- All data referenced with chainage and GPS coordinates.

INCLUDES:

- Central ROMDAS system,
- Single or dual Bump Integrators,
- Single or dual Laser Profilometers
- High Resolution DMI (HRDMI)
- GPS receiver,
- Survey laptop and vehicle mount.

SUGGESTED UPGRADES:

- Upgrade the Laser Profilometers to collection Macrotexture (MPD)
- Right of Way (ROW) video logging camera.

Laser Profilometers
- *High Accuracy Roughness (IRI),*
- *Longitudinal Profile*
- *Optional: Macrotexture(MPD)*

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Common Configuration

Consultant Friendly System

RECOMMENDED FOR:

- Consultants or other users who's requirements vary from project to project and want minimal upfront investment cost.

KEY BENEFITS:

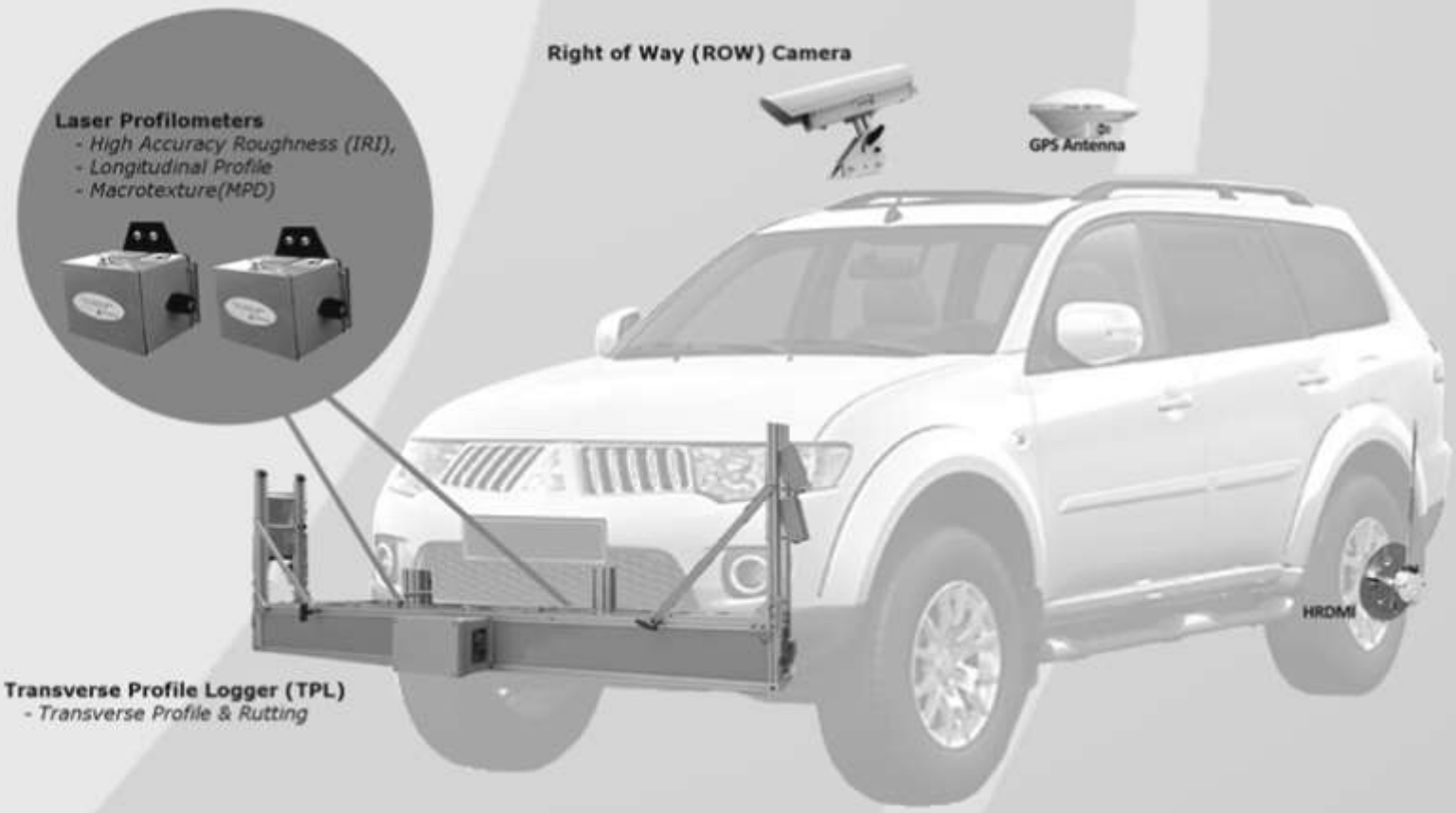
- Collects many of the core datasets required for post-construction or network surveys.
- Adjustable camera mounting and DataView software gives users the flexibility of being able to measure visible condition or asset data in the office,
- Complies with widely accepted ASTM and World Bank standards for collecting data,
- Scalable by adding new modules as required in the future,
- Can be easily installed on locally supplied vehicles,
- Use ROMDAS keycoding feature to perform visual condition and asset inspections while surveying,
- All data referenced with chainage and GPS coordinates.

INCLUDES:

- Central ROMDAS system,
- Single or dual Bump Integrators,
- Single or dual Laser Profilometers with Macrotexture upgrade,
- Transverse Profile Logger (TPL),
- 1 x Right of Way (ROW) camera,
- High Resolution DMI (HRDMI),
- DGPS receiver,
- Survey laptop and vehicle mount,
- DataView software.

SUGGESTED UPGRADES:

- Add additional ROW cameras for wider or multiple viewing angle (e.g. left, center, right, rear),
- Add a Pavement View camera for more detailed images of surface defects,
- Add mobile mapping software to calculate the GPS position of roadside inventory for detailed GIS mapping.



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Common Configuration

Cost Effective Network Survey System

RECOMMENDED FOR:

- Consultants or Government departments with limited budgets but are responsible for maintaining large regional or national road networks.

KEY BENEFITS:

- Exceptional price for a complete system capable of outputting the wide range of data needed for managing a modern road network,
- Complies with industry accepted ASTM and other international standards,
- Pavement View camera with DataView's video rating feature allows uses to record and measure visible pavement defects such as cracking and potholes.
- Create detailed GIS maps directly from ROW images using the Mobile Mapping software,
- Can be easily installed on locally supplied vehicles,
- Use ROMDAS keycoding feature to perform visual condition and asset inspections while surveying,
- All data referenced with chainage and GPS coordinates.

INCLUDES:

- Central ROMDAS system,
- Single or dual Laser Profilometers with Macrotexture upgrade,
- Transverse Profile Logger (TPL),
- 3 x Right of Way (ROW) cameras,
- Pavement View camera,
- Road Geometry Module,
- High Resolution DMI (HRDMI),
- DGPS receiver,
- Semi-ruggedized PC and vehicle mount,
- DataView software

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Common Configuration

State-Of-The-Art Network Survey System

RECOMMENDED FOR:

- Anyone who want the latest technology, highest accuracy and most reliable data for maintaining modern road networks.

KEY BENEFITS:

- Automatically collect cracking, potholes and other pavement defects,
- Utilizes advanced LCMS scanning lasers from world renowned Pavemetrics/INO and at the best price on the market,
- High resolution 3D profiling allows for the analysis of datasets not possible from traditional vehicle mounted systems,
- Pavement imaging during day or night,
- Lane tracking feature ensure consistent and repeatable profile positioning, overcoming influences like driver wander,
- Easily create detailed GIS maps using the Mobile Mapping software and 360 field of view (FOV) imagery,
- Install on locally supplied vehicles,
- JPEG images with automatically overlaid defects, include custom severity color coding,
- Innovative design allows the whole system to run off the vehicle power supply (i.e. no additional generators required),
- Easier maneuverability with no large bumper mounted devices,
- Use ROMDAS keycoding feature to perform visual condition and asset inspections while surveying,
- All data referenced with chainage and GPS coordinates.

INCLUDES:

- Central ROMDAS system,
- High Resolution DMI (HRDMI),
- DGPS receiver,
- Rack mount computer system,
- LCMS module,
- LCMS Roughness upgrade,
- LCMS Geometry upgrade
- 360 degree camera,
- DataView software,
- Mobile Mapping software.

SUGGESTED UPGRADES:

- None, this is the best you can get!

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Common Configuration

Dedicated Mobile Mapping System

RECOMMENDED FOR:

- Those who want to record accurate GPS locations and measurements of roadside assets for establishing GIS databases.

KEY BENEFITS:

- Extremely time and cost efficient option compared to traditional methods, such as manual field surveys or Lidar systems,
- Full 360 field of view imagery,
- GPS receiver capable of real-time sub-meter GPS accuracy available worldwide,
- Easily create detailed GIS maps using the Mobile Mapping software and 360 field of view (FOV) imagery,
- GIS layers are exportable in commonly used formats (e.g. Shape or KML),
- Secure magnetic rood mounting for easy setup,
- Use ROMDAS keycoding feature to perform visual condition and asset inspections while surveying,
- All data referenced with chainage and GPS coordinates.

INCLUDES:

- Central ROMDAS system,
- GPS receiver,
- Semi-rugged computer system and vehicle mount,
- 360 degree camera,
- ROMDAS geometry unit,
- DataView software,
- Mobile Mapping software,
- Omnistar VBS subscription (DGPS signal).

SUGGESTED UPGRADES:

- Upgrade the GPS receiver and Omnistar subscription for higher accuracy GPS positioning.
- For customers with limited budgets the 360 camera can be replaced with standard ROW cameras,
- Geometry unit can be removed for a lower cost, lower accuracy system.

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Common Configuration

Dedicated iRAP System

RECOMMENDED FOR:

- Organizations responsible for road safety and intend to conduct iRAP surveys.

KEY BENEFITS:

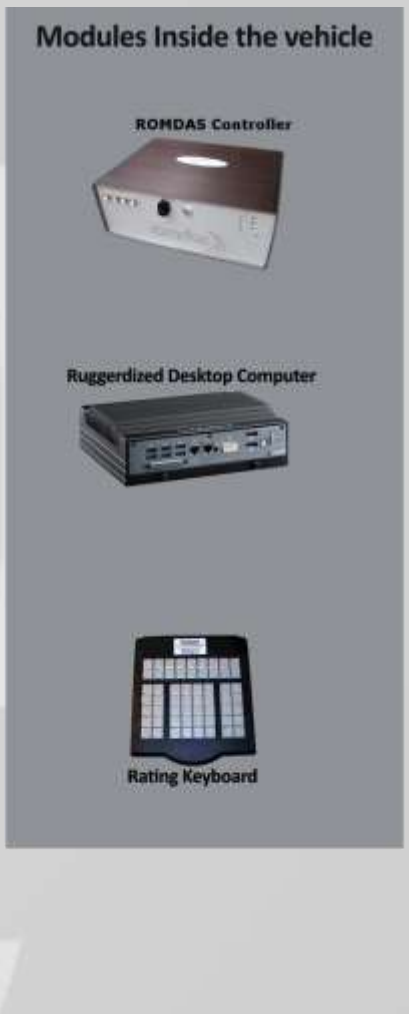
- ROMDAS is an iRAP accredited system, this helps streamline an organization's certification as iRAP service providers,
- DataView offers a user friendly and comprehensive iRAP coding interface, including the ability to export data in compliant formats ready for star rating analysis,
- Secure magnetic rood mounting for easy setup,
- Use ROMDAS keycoding feature to perform visual condition and asset inspections while surveying,
- All data referenced with chainage and GPS coordinates.

INCLUDES:

- Central ROMDAS system,
- GPS receiver,
- Semi-rugged computer system and vehicle mount,
- 3 x ROW cameras,
- ROMDAS Geometry unit,
- DataView software with iRAP version upgrade,.

SUGGESTED UPGRADES:

- Add or subtract additional ROW cameras depending on the iRAP Class required for the project,
- Add any of ROMDAS' pavement condition modules to simultaneous collect iRAP and road maintenance data.



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