Hawkeye 2000 Series

The Hawkeye 2000 Series is a professional range of equipment, designed to meet the most demanding of survey applications.

The 2000 Series is a highly specialised range of survey products. The modular design of the system enables complete scaleability for future growth and can be installed in a wide variety of vehicles due to its limited requirement for computer hardware. Once your requirements are established, simply customise the Hawkeye 2000 packages to meet your needs.

Our advanced research and development program ensures we provide our clients the best products, utilising the latest research and technologies.

Collecting accurate, time stamped data is assured in Hawkeye through the use of our innovative development, Heartbeat. The Heartbeat module ensures that all data is accurately linked to a primary key and allows for the integration of current and future data acquisition modules, meaning seamless upgrades of your equipment.

All systems are manufactured in compliance with ISO 9001:2008 quality systems and are backed by ARRB's experienced customer support team and over 50 years of road and transport research.

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Hawkeye Network Survey Vehicle

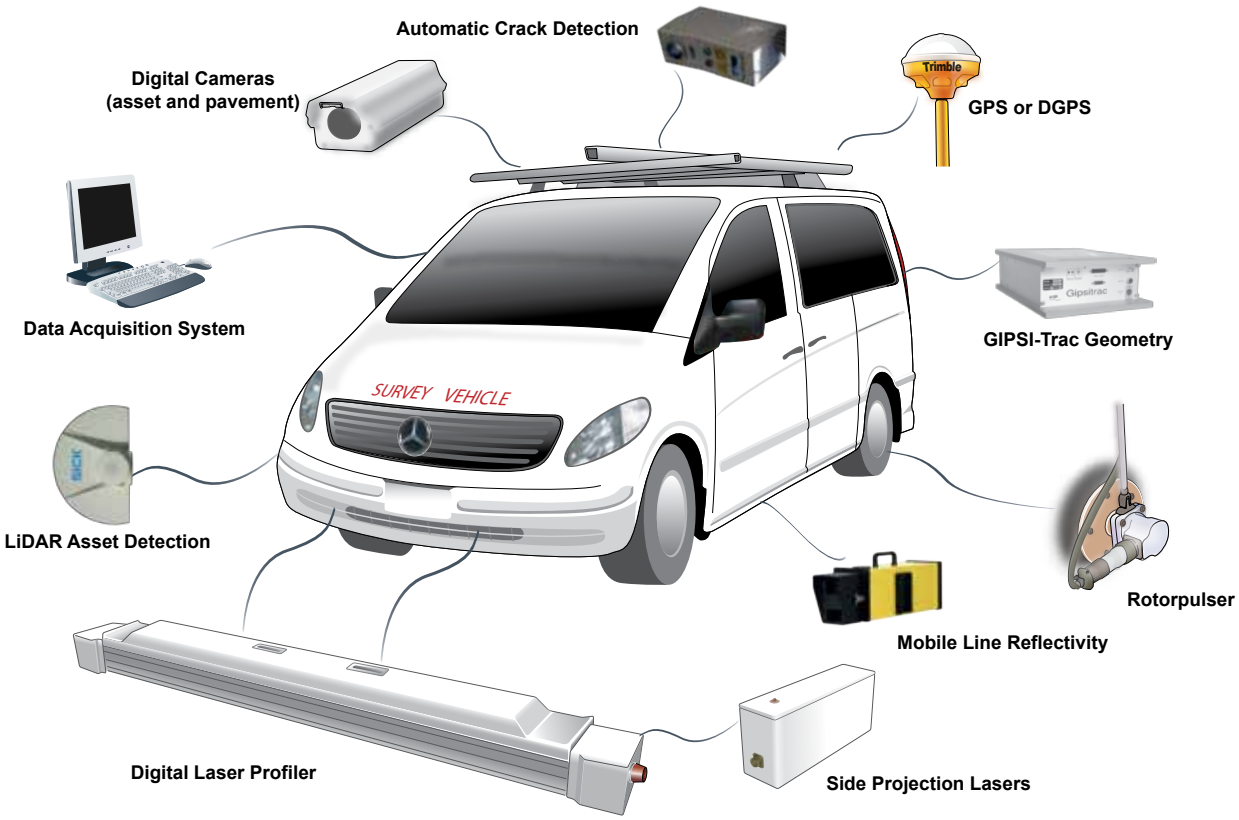
The Hawkeye 2000 Series is a modular design, allowing for complete scaleability for future growth.

Hawkeye 2000 packages are installed on a dedicated Network Survey Vehicle, allowing for safe and efficient data collection of multiple network parameters.

Once your requirements are established, simply customise the Hawkeye 2000 packages to meet your needs.

Should your requirements grow in the future, you can simply upgrade your existing Hawkeye by adding new modules.

With new technologies being integrated frequently, ARRB will always have the solution you need to meet your road network data requirements.



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Features

- Fully integrated system with common data and survey control referencing, utilising the Heartbeat module
- Enables safe and efficient data collection for both urban and rural surveys
- Survey time is reduced by collecting all condition data and imagery in a single pass
- Uses standard interfaces and protocols to take advantage of future devices and protect your investment
- Installation available of a vast range of vehicles
- Available with one or two operator consoles

Applications

- Network and project level road and asset collection surveys
- Routine pavement monitoring surveys
- Roadside inventory and asset management
- Road geometry and mapping surveys
- Contractor quality control
- Road safety assessment
- Line marking reflectivity
- Airport runway inspections

Compliance with standards

- ASTM E950: Longitudinal profile
- AASHTO PP37: Pavement roughness
- ASTM E1845: Pavement macrotexture
- ISO 13473: Mean Profile Depth (MPD)

H2000 Automatic Crack Detection

The H2000 Automatic Crack Detection (ACD) system enables automatic detection of cracks and other road surface features.

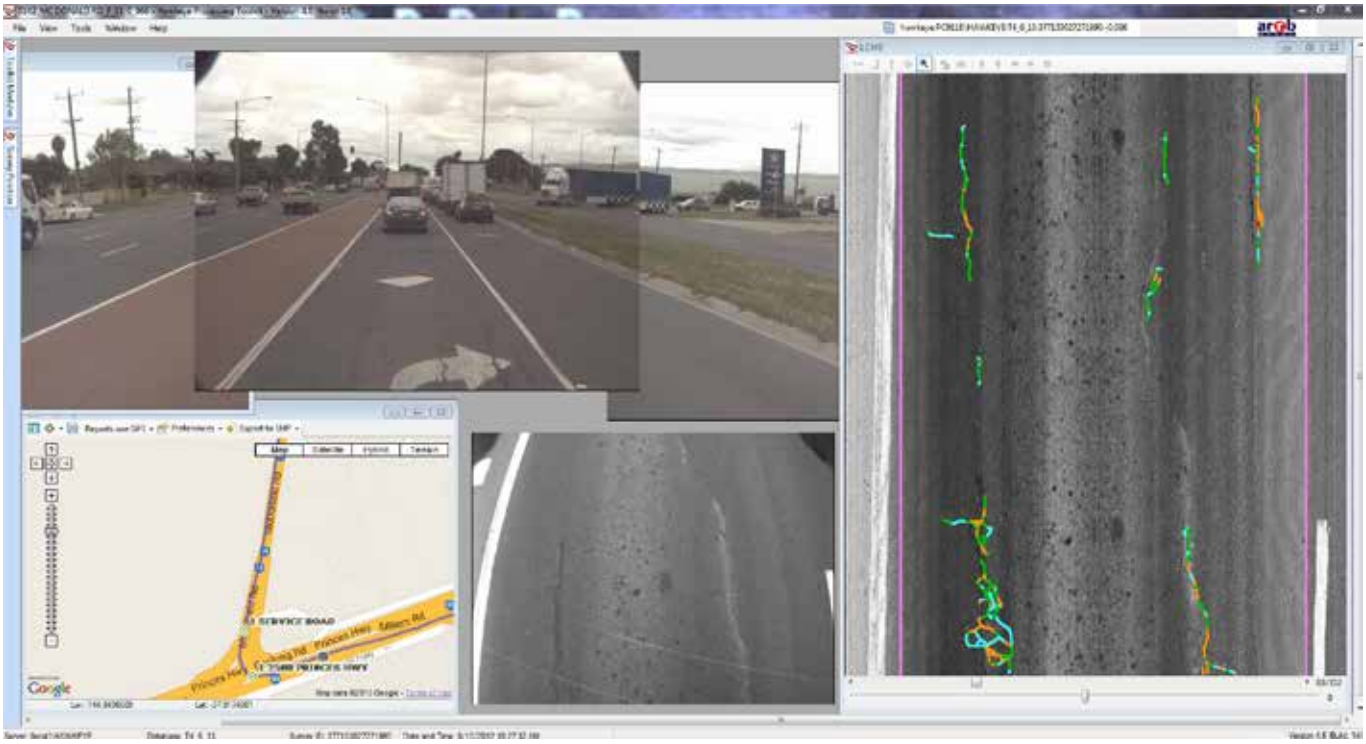
The ACD system comprises two high performance 3D laser units that are fitted at the rear of the survey vehicle, vertically above the pavement.

The unit projects a laser line onto the pavement and the image is captured by the camera, allowing it to measure the transverse profile of the pavement to a 0.5 mm height resolution.

The ACD is fully integrated into the Hawkeye platform meaning outputs are precisely aligned, both linearly and spatially, with the measurements from other sensors.

We also have the ability to analyse the 'crack maps' using our own proprietary software. The flexibility the Hawkeye software allows reporting of the type, severity and extent of cracking, in a manner that meets the specific needs of the user.

ARRB has a strong working relationship with manufacturer of the 3D sensors and continues to provide them with feedback to increase the functionality of the system.



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Features

- Rut depth measured over 4 m width at 1 mm transverse resolution
- Rutting measured in accordance with methodology found in ASTM E1703
- Day and night operation, unaffected by shadows
- Low power consumption
- Data compression algorithms to minimise storage
- Lightweight and waterproof
- Measurements are possible on all sealed surfaces
- Data is linked to chainage and GPS coordinates
- Operational at highway speeds to reduce survey time and costs

Applications

- Network-level pavement condition assessment
- Accurate quality assessments for contractors
- Routine pavement monitoring surveys
- Contract validation

Available outputs

- Hawkeye custom cracking reports
- Rutting
- Lane marking
- Pavement defects (potholes, kerb and edge drop off)
- Raveling

H2000 Digital Laser Profiler

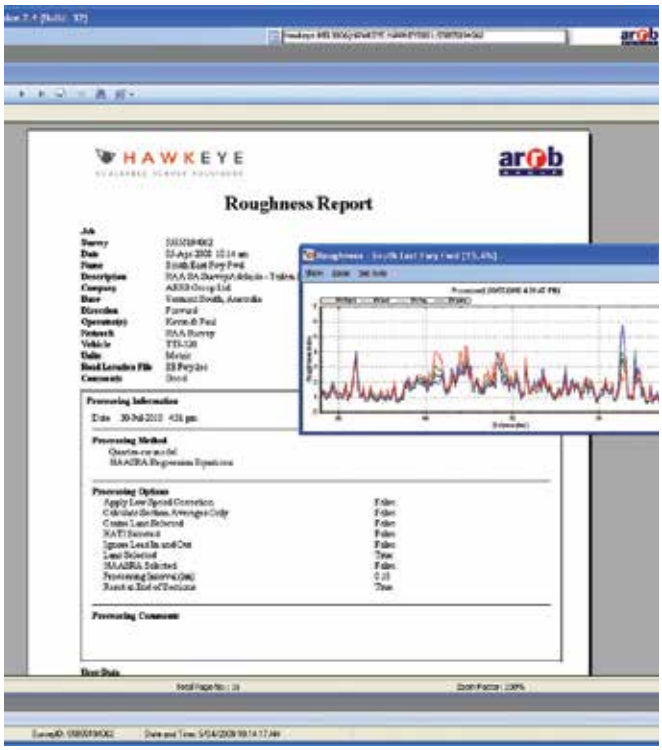
The H2000 Digital Laser Profiler (DLP) can be configured with a variety of sensors to enable the collection of road condition data.

The data collected includes: International Roughness Index (IRI), Ride Number (RN), Rut Depth, Mean Profile Depth (MPD), Sensor Measured Texture Depth (SMTD) and other parameters.

The system comprises a vehicle-mounted measurement beam equipped with ARRB's specially developed lasers, enabling the collection of longitudinal profile, roughness and macrotexture (MPD and SMTD).

The profiler is configurable from a single laser measurement system, to a 17 laser system, ensuring your specific requirements can be met.

Used in conjunction with the Hawkeye Processing Toolkit, you have the ability to produce tables, graphs, reports and exports from your collected data.



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Features

- Upgradeable to allow for the addition of more lasers
- Rugged, aluminium beam design
- Operational at highway speeds to reduce survey time and costs
- Results are independent of vehicle type
- Measurements possible on all sealed surfaces
- Data is linked to chainage and GPS coordinates

Applications

- Network level surveys with international standard results
- Accurate quality assessments for contractors
- Baseline surveys
- Contract validation

Available outputs

- Roughness
- Longitudinal profile
- Transverse profile
- Rutting
- Faulting
- Macrotexture
- Distance
- GIS outputs

Compliance with standards

- ASTM E950: Longitudinal profile
- AASHTO PP37: Pavement roughness
- ASTM E1845: Pavement macrotexture
- ISO 13473: Mean Profile Depth (MPD)

H2000 Asset View Digital Imaging System

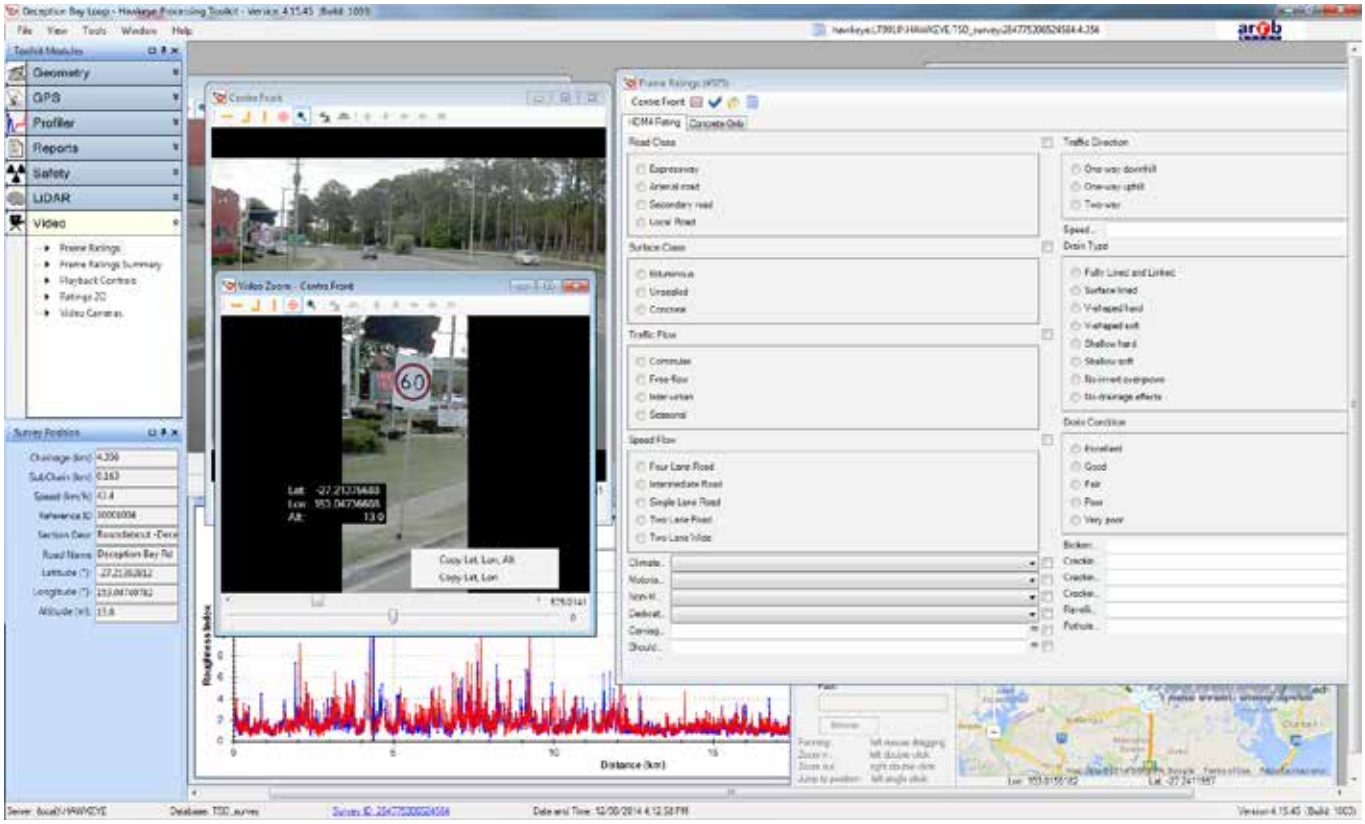
The H2000 Asset View Digital Imaging System (DIS) is capable of visually identifying and locating roadside features.

The system comprises the latest digital camera technology and produces crisp, high-resolution video frames to ensure a continuous digital record of the roadway. The calibrated video cameras accurately log digital images of roadside assets against other parameters such as distance and GPS.

Fully motorised lenses enable the real-time adjustment of the optical zoom control, focus and iris for high-quality images.

Up to eight cameras can be supported, each in a waterproof enclosure and all controlled through the common Hawkeye interface.

The Hawkeye Processing Toolkit software ensures that the survey database can be reviewed, edited and processed quickly and efficiently. The data from each module can then be compared against other results and exported to pavement and asset management systems.



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Features

- Provides continuous, high-resolution, full-colour digital images
- Supports up to eight cameras
- Uses .AVI storage files
- Data is linked to chainage and GPS coordinates
- Operational at highway speeds to reduce survey time and costs
- Images can be used to measure, geo-reference and note points of interest

Applications

- Visual identification of roadside features and assets
- Right-of-way roadside condition assessment
- Asset location for GIS applications
- Road safety assessment

Available outputs

- Digital imagery
- GPS location / distance

H2000 Pavement View Digital Imaging System

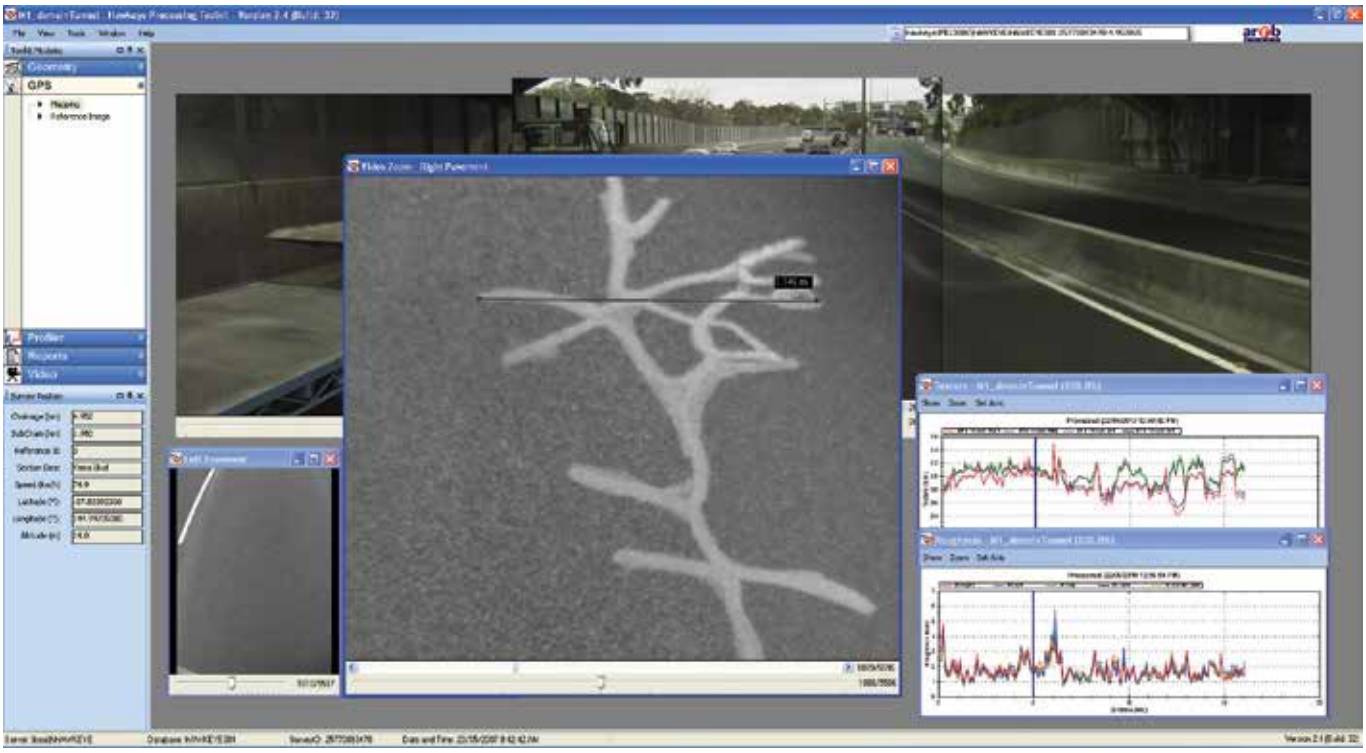
The H2000 Pavement View Digital Imaging System (DIS) is utilised for visually identifying and locating deterioration and cracking.

The system utilises the latest in both area scan or line scan digital camera technology, to produce high-resolution video images.

The cameras accurately log digital images of the pavement against other parameters such as distance/chainage, GPS and profile. The camera and lens are fitted into a waterproof enclosure which is mounted on a vehicle roof rack and optional extendable beam.

The Hawkeye Processing Toolkit software ensures that the survey data can be reviewed, edited and processed quickly and efficiently.

The data from each module can then be compared against other results and exported to pavement and asset management systems.



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Features

- Provides continuous, high-resolution, black and white digital images
- Offers full lane coverage through the use of one or two cameras
- Uses .AVI storage files
- Data is linked to chainage and GPS coordinates
- Operational at highway speeds to reduce survey time and costs

Applications

- Pavement condition and deterioration assessment
- Pavement deterioration models and management
- Road surface marking identification
- Crack screening and measurement
- Verification and validation of other data streams

Available outputs

- Digital imagery
- GPS location / distance

H2000 Gipsi-Trac Geometry System

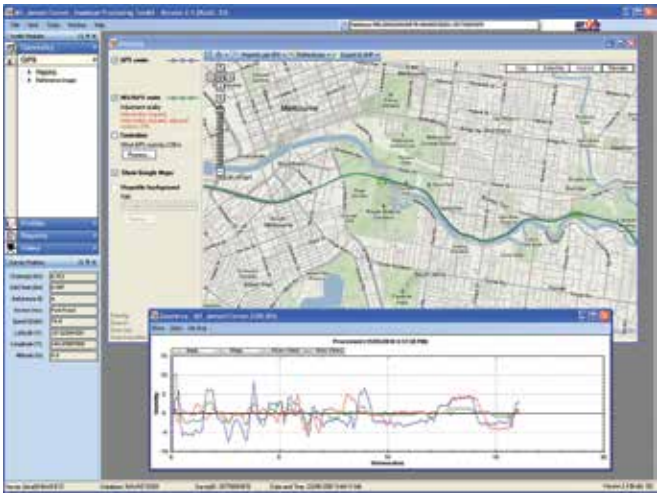
The H2000 Gipsi-Trac Geometry System collects road geometry information and navigation data to produce continuous 3D maps.

The system includes the Gipsi-Trac microprocessor-based system, which records and combines inertial data from gyroscope, accelerometer and distance sensors with GPS position. The built in dead-reckoning capability allows for position data to be recorded when in tunnels, under bridges and locations with little or no GPS coverage.

It outputs data in a variety of customisable geographic projection systems that allow the user to export the data in their GPS native format, with no conversions necessary.

The Hawkeye Processing Toolkit software ensures that the survey data can be reviewed and processed quickly and efficiently.

The data from each module can then be compared against other results and exported to most pavement and asset management systems.



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Features

- Uses an integrated GPS receiver and dead-reckoning sensors
- Typical mapping accuracy of 1 m after processing
- Improved gyroscope provides higher accuracy results
- Exports to CSV
- Exports to point or polyline shapefiles
- Readily interfaces with a number of GIS packages
- Has fully customisable GPS projection methods (Lat, Long, Easting, Northing and a range of datums)

Applications

- Road geometry and position for 3D mapping
- Operates in all locations:
  - Inside tunnels
  - Under bridges
  - highly vegetated or mountainous regions
- Estimate speed and travel times
- Locate potential sites for rainfall ponding
- Conformance to design specifications

Available outputs

- Grade
- Cross slope
- Horizontal and vertical curvature
- Inertially corrected GPS location
- Distance

H2000 LiDAR Asset Detection

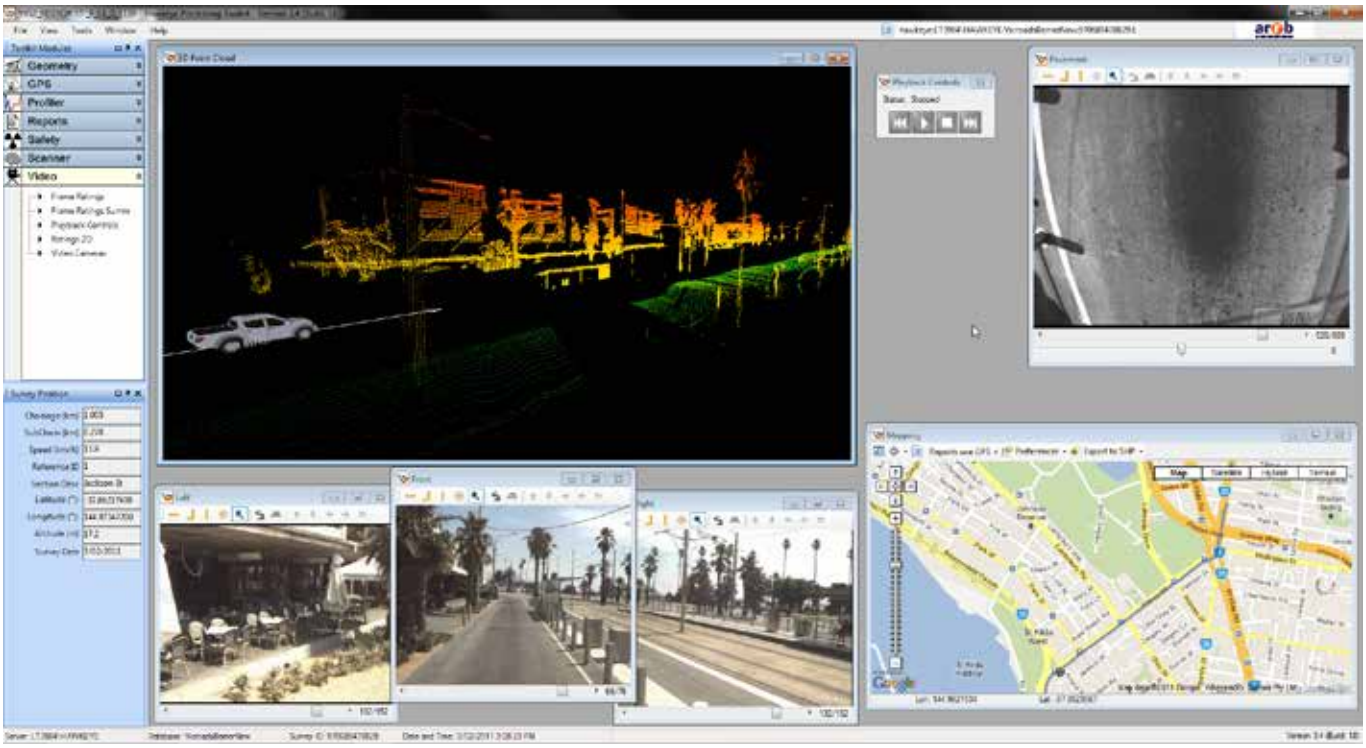
The H2000 Light Detecting and Ranging (LiDAR) device is used to measure the distance of objects from the survey vehicle.

LiDAR technology has been common in geographical surveying for many years and is applied in similar ways to road surveying. The system uses a rotating laser that records distance to build up a three dimensional picture of the roadway and surrounds.

LiDAR collects extensive point cloud information to build up a very accurate simulation of the road and roadside environment.

The device can be mounted at any position on the vehicle, in any direction, to suit the client's requirements. This flexible positioning allows the unit to collect objects above and to the side of the vehicle, or facing the road for linemarking detection.

The data is then processed instantly within the Hawkeye Processing Toolkit software, allowing for review in conjunction with other collected parameters.



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Features

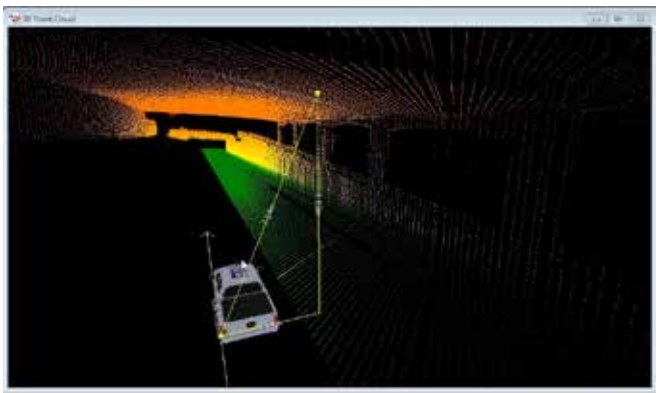
- Up to 270 deg coverage (per unit)
- Variable mounting positions
- Data is linked to chainage and GPS coordinates
- Operational at highway speeds to reduce survey time and costs
- Exports to CSV

Applications

- 3D mapping and visualisation of road corridor
- Accurately measure roadside objects
- Bridge height measurement
- Gantry height measurement
- Lane width measurement
- Hazards offsets (safety)

Available outputs

- 3D point cloud imagery
- GPS location / distance
- Hazard exception report
- Remission



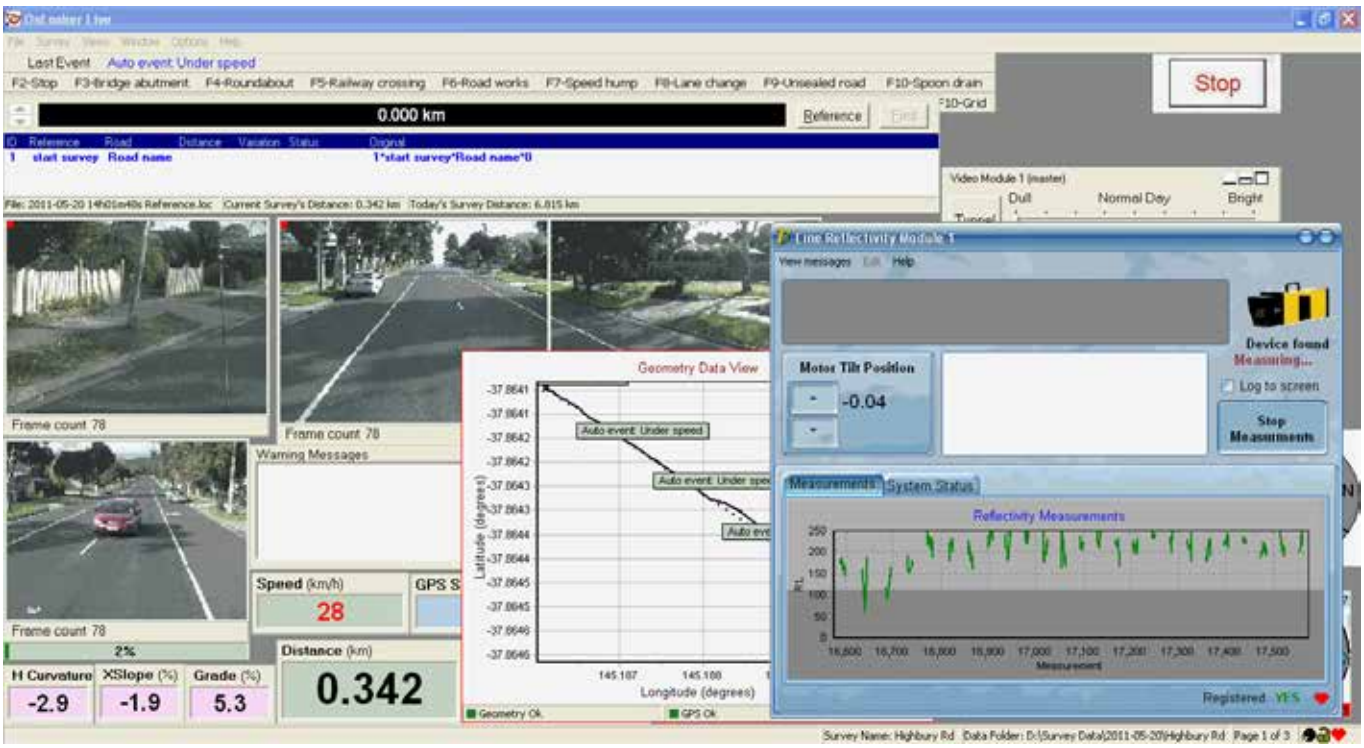
H2000 Mobile Line Reflectivity

The Hawkeye 2000 Mobile Line Retroreflectivity package is a traffic speed device for measuring road line marking reflectivity.

An extension of Delta's well-known handheld range, the LTL-M has been integrated into the Hawkeye platform to allow simultaneous collection of line reflectivity as part of general network surveys.

The LTL-M is a robust, reliable and advanced instrument developed specifically for network survey. It uses the latest camera and illumination technology resulting in high accuracy data collection which is independent of road geometry and vehicle tracking.

The Hawkeye 2000 Mobile Line Reflectivity system measures night time visibility of both white and yellow road markings under dry and wet road conditions, It simultaneously measures the daylight contrast.



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Features

- Continuous measurement at highway speeds
- Measures and reports double lines
- Sunlight compensation for daylight contrast measurement
- User definable reporting interval
- Data is linked to chainage and GPS coordinates

Available outputs

- Retroreflectivity (RI)
- Marking type (solid, segmented)
- Number of road studs
- Lane width
- Daylight contrast

Compliance with standards

- ASTM E1710: Retroreflective pavement measurement
- EN 1436: Road marking performance

Applications

- Line marking reflectivity
- Road-stud reflectivity
- Line marking mapping
- Quality assurance

Hawkeye Software Suite

The Hawkeye software suite is a professional and powerful acquisition and data analysis combination.

Onlooker Live - Acquisition software

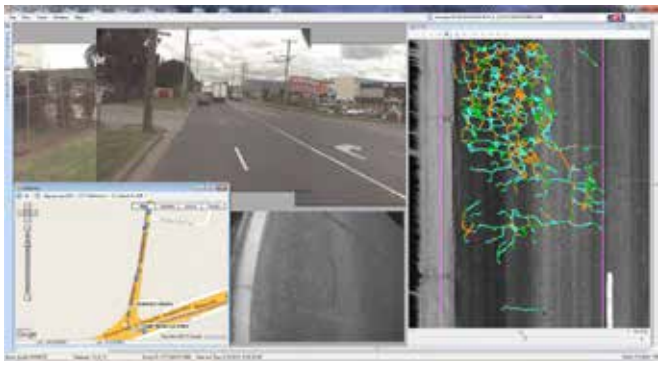
Hawkeye Onlooker Live software is an interactive, real-time acquisition control interface that is capable of simultaneously controlling all inputs from any Hawkeye system, from a single software application. The software runs on a dedicated computer in the vehicle or on a laptop-based system, with a fully customisable layout. The network control interface enables real-time result reporting and the capability to progressively add new Hawkeye modules, without the need for additional software.

Features

- Real-time Windows graphical user interface for management of multiple computer systems
- Customiseable screen layouts to suit individual operator requirements
- Multiple language support: English, Chinese, Spanish, Arabic and Russian
- Survey navigational tools such as compass, location reference points, maps and recording of events
- Computer generated speech for system warnings and other items requiring attention
- Supports a range of road reference formats

Software capability

- Digital display of:
  - profilometry,
  - video imagery,
  - speed and distance
  - geometry
- Graphical display of:
  - GPS maps
  - inertial geometry mapping
  - road profile information
  - LiDAR plot
  - user defined survey notes tool



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Processing Toolkit - Analysis software

The easy-to-use interface of Hawkeye Processing Toolkit features an integrated image viewer and centralised database to review all collected survey parameters. The software can be used to review and rate individual video frames against chainage and GPS, save images to file and zoom-in to inspect areas of interest. Multiple images can be assessed simultaneously and the road can be 'driven' at a rate selected by the operator.

Features

- Extensive analysis and reporting capability
- Advanced mapping interface that supports Google background maps
- Centralised databases to allow multiple users to process and view the same survey data simultaneously
- Multiple language support: English, Chinese, Spanish, Arabic and Russian
- Metric and Imperial measurement systems supported
- Distributed processing for ACD
- Windows launching allowing for cross reference of data between applications
- Batch rubber banding and editable reference points
- Survey search filter
- Batch processing and exporting
- Export to most PMS and GIS applications
- Data export to CSV, PDF, MS Word, MS Excel, RTF and SHP formats
- Windows (32 and 64 bit) compatible

Software capability

- Calculation of:
  - International Roughness Index (IRI)
  - MPD and SMTD macrotexture
  - Cracking
  - Rutting
  - Faulting
  - Longitudinal profile
  - Geometry
- Image area / length / height measurement
- Image stitching, zoom and resizing
- Asset location
- Profilometry analysis
- Graphical inertial / GPS mapping
- Shapefile imports
- User configurable rating forms
- Advanced HDM-4 exporting

Hawkeye Data Viewer, viewing only software is also available.

The Hawkeye software suite is maintained by a large team of software developers and testers, with new releases occuring approximatwely every 8 weeks. ARRB prides themselves on integrating features based on customer feedback, and we encourage all of our clients to submit their comments or suggestions for improvements.

About ARRB

ARRB Group Ltd (ARRB) provides research, consulting and information services to the road and transport industry. ARRB applies research outcomes to develop equipment that collects road and traffic information and software that assists with decision making across road networks. ARRB is the leading provider of road research and best practice workshops in Australia. ARRB Group Ltd | ABN 68 004 620 651

Victoria | Head Office
500 Burwood Highway,
Vermont South VIC 3133,
Australia.
P: +61 3 9881 1555,
F: +61 3 9887 8104,
info@arrb.com.au

New South Wales
2-14 Mountain St,
Ultimo NSW 2007,
Australia.
P: +61 2 9282 4444,
F: +61 2 9280 4430,
arrb.nsw@arrb.com.au

Queensland
123 Sandgate Road,
Albion QLD 4010,
Australia.
P: +61 7 3260 3500,
F: +61 7 3862 4699,
arrb.qld@arrb.com.au

South Australia
Level 5 City Central, Suite
507, 147 Pirie St
Adelaide SA 5000,
Australia.
P: +61 8 7200 2659,
arrb.sa@arrb.com.au

Western Australia
191 Carr Place,
Leederville WA 6007,
Australia.
P: +61 8 9227 3000,
F: +61 8 9227 3030,
arrb.wa@arrb.com.au

China | International
Floor 13, Zhen Xing
Building, 118 North Hu Bin
Road, Xiamen PRC.
P: +86 592 2135 552,
F: +86 592 2136 663,
arrb-china.com.cn

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arrb GROUP
arrb.com.au