

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



HAWKEYE 2000 SERIES

The Hawkeye 2000 Series is a highly specialised range of survey products that can be installed in a wide variety of vehicles due to its limited space and power requirements. The modular design of the system enables easy configuration of multiple sensors to meet or exceed the toughest specifications.

Collecting accurate distance, time, and spatial information is assured in Hawkeye through the use of our innovative development, the Heartbeat. The Heartbeat module and support software accurately synchronises each sensor in the system, aligned against multiple inputs from a Distance Measurement Instrument (DMI), DGPS, and inertial systems.

This allows for seamless upgrades of your equipment. Simply choose your required modules, and they can be added at the time of initial installation, or at a later date convenient to you.

Our advanced research and development program ensures we provide our clients the best products, utilising the latest research and technologies, backed by ARRB Systems experienced support team.



Features

- The Heartbeat module provides a fully integrated system with common data and survey control referencing
- 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 on a vast range of vehicles
- Available with one or two operator consoles

Compliance with standards

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

HAWKEYE NETWORK SURVEY VEHICLE

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 Systems will always have the solution you need to meet your road network data requirements.

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





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

Outputs

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

H2000 AUTOMATIC CRACK DETECTION

The H2000 Automatic Crack Detection (ACD) system enables automatic detection of cracks and other road surface features. The ACD system is comprised of 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 of the Hawkeye software allows reporting of the type, severity and extent of cracking, in a manner that meets the specific needs of the user.

Applications

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





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

Compliance with Standards

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

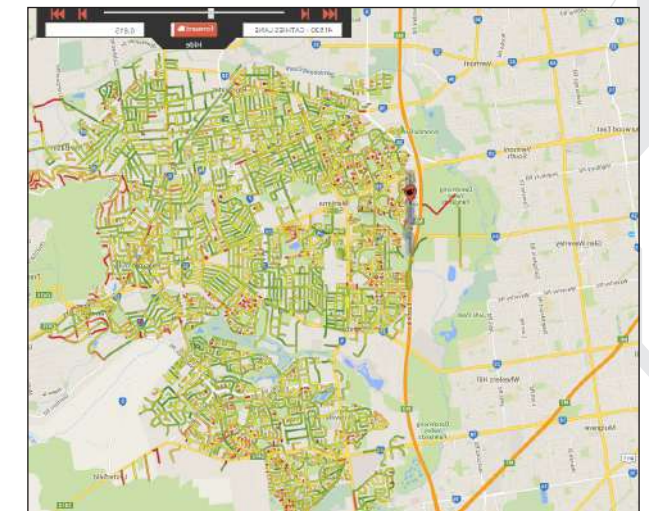
H2000 DIGITAL LASER PROFILER

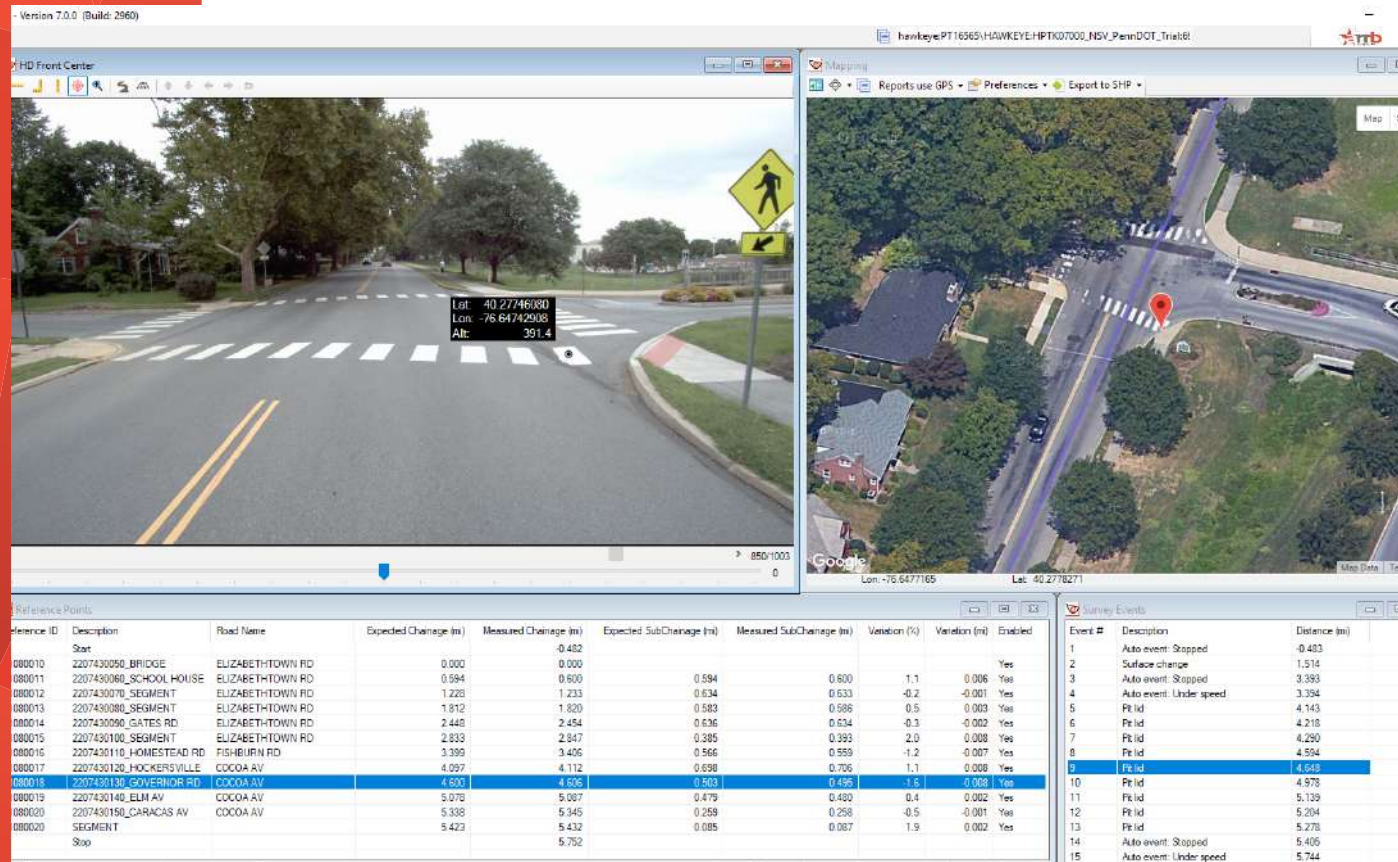
The H2000 Digital Laser Profiler (DLP) can be configured with a variety of sensors to enable the collection of road condition data, including: International Roughness Index (IRI), Ride Number (RN), Rut Depth, Mean Profile Depth (MPD), Sensor Measured Texture Depth (SMTD) and other parameters

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.

Applications

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





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

Outputs

- Digital imagery (up to 3 cameras stitched)
- GPS location / distance

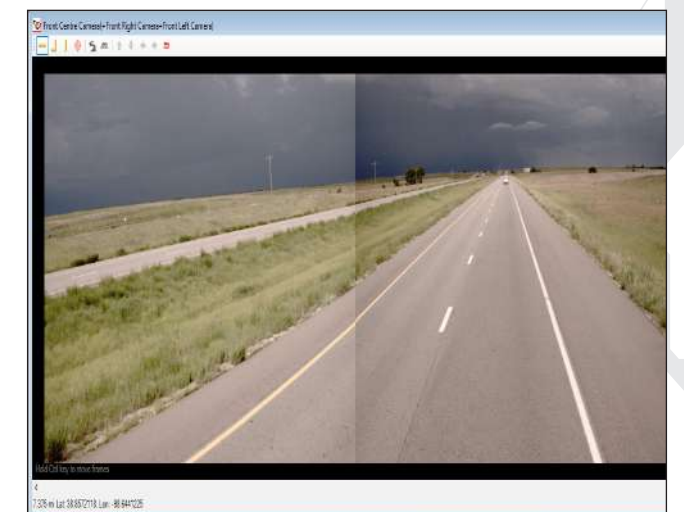
H2000 DIGITAL IMAGING SYSTEM

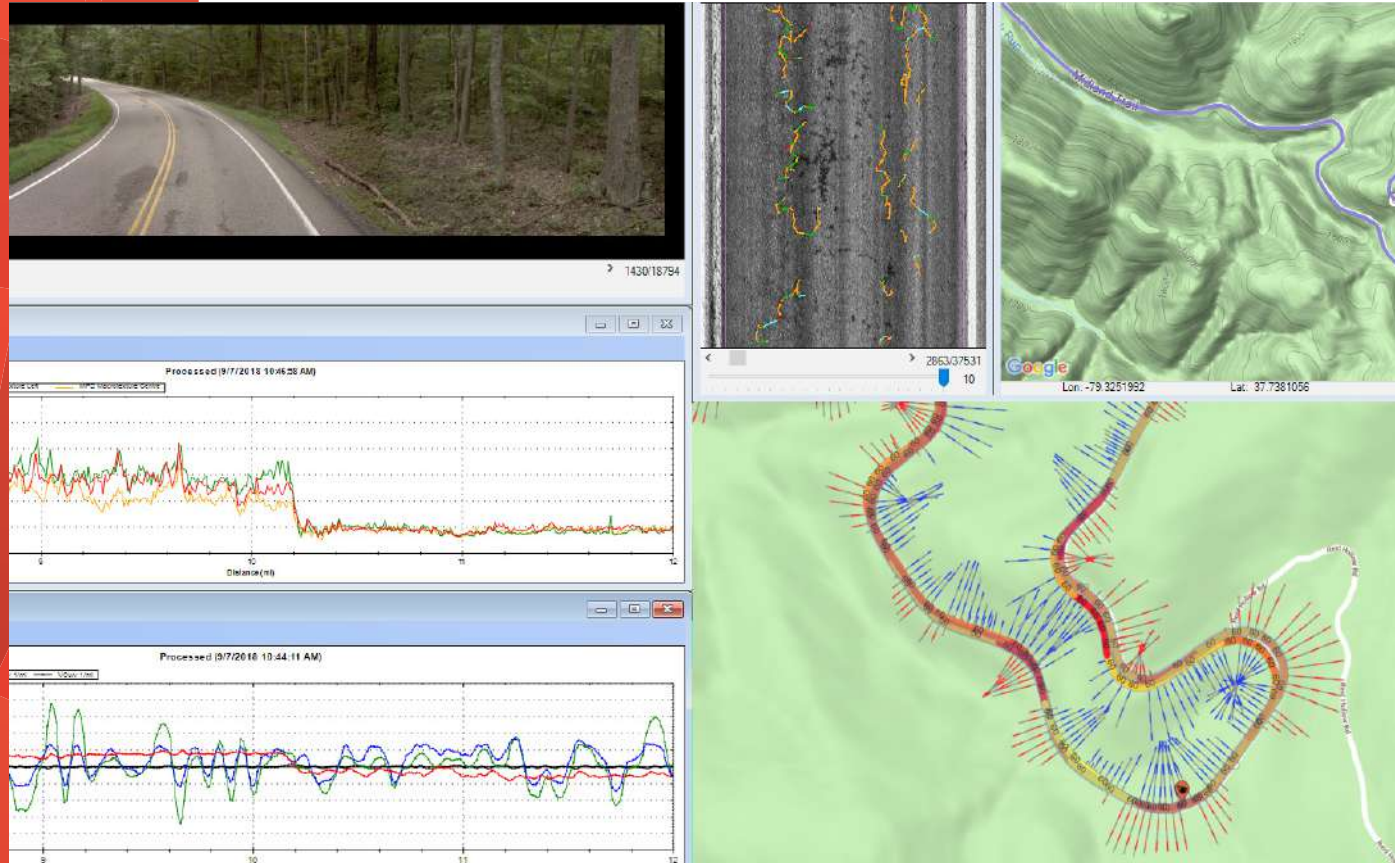
The H2000 Asset View Digital Imaging System (DIS) is capable of visually identifying and locating roadside features. The system boasts full high definition (HD), colour video frames to ensure a continuous digital record of the roadway. The calibrated video cameras accurately log digital images of roadside assets against other parameters such as distance and GPS.

Motorised lenses enable the real-time adjustment of the iris for high quality images, with manual zoom and focus controls. Wide field of view lenses are also available with fixed iris, automatic exposure controls. Up to eight cameras can be supported, each in a waterproof enclosure and all controlled through the common Hawkeye interface.

Applications

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





Features

- Uses an integrated GNSS receiver and dead-reckoning inertial sensors
- 200Hz fused data output
- Typical mapping accuracy of 1.2 m
- Exports to CSV and point or polyline shapefiles
- Operational at highway speeds to reduce survey time and costs
- Fully customisable GPS projection methods (Lat, Long, Easting, Northing and a range of datums)
- Supports Universal / Transverse Mercator,
- Operates in all locations:
 - Inside tunnels
 - Under bridges
 - highly vegetated or mountainous regions

Outputs

- Grade
- Cross-slope
- Horizontal and vertical curvature
- Inertially corrected GNSS position
- Distance

H2000 GIPSI-TRAC GEOMETRY

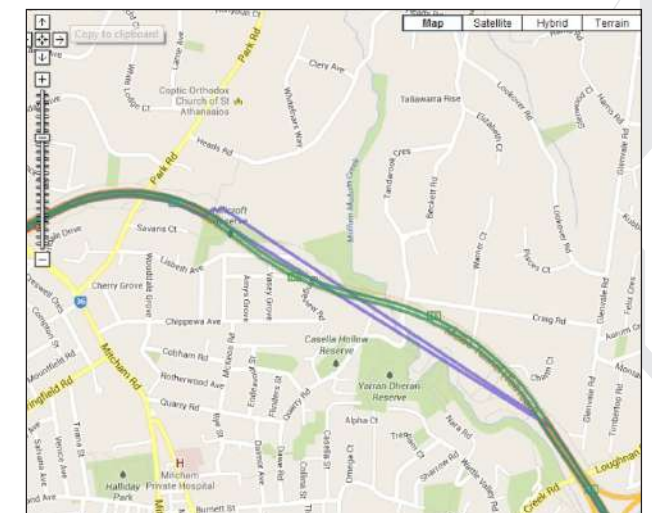
The GIPSI-Trac 2 is the next generation GNSS + INS (Global Navigation Satellite Systems + Inertial Navigation System) geometry module, using dead-reckoning sensors and dual GNSS antennas.

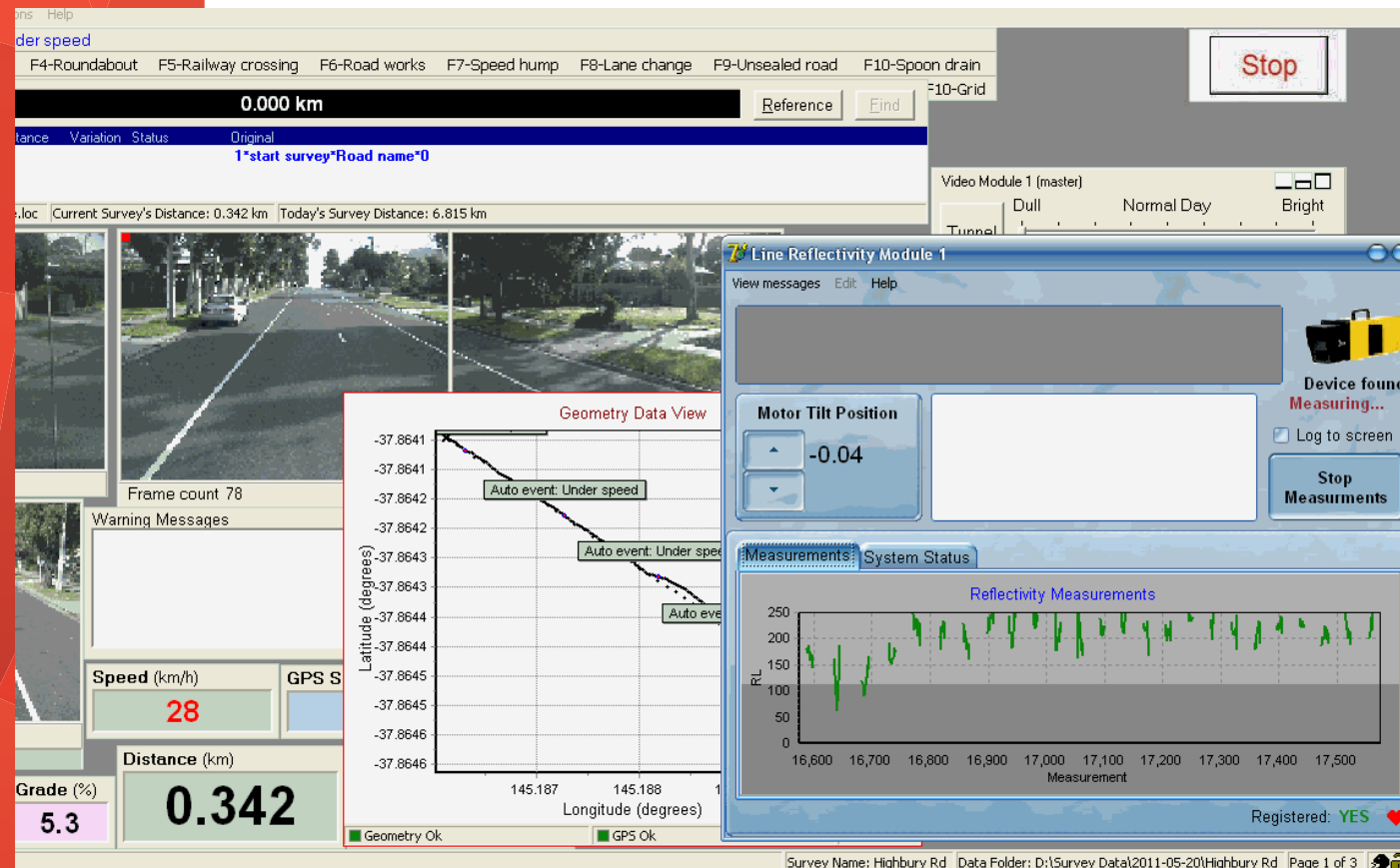
This combined system provides a far greater update rate and supports more satellite systems than previous GNSS offerings, including SBAS and Omnistar. It boasts real-time fused GNSS/INS outputs in all survey conditions, including periods of GNSS outage.

The system records and combines inertial data from a 3-axis gyroscope, 3-axis accelerometer and a distance sensor with dual GNSS positional information. The built-in dead-reckoning allows for position data to be recorded when in tunnels, under bridges and locations with little or no GNSS coverage.

Applications

- Road geometry and measurement
- Mapping
- Conformance to pavement specifications





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

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

H2000 MOBILE LINE REFLECTIVITY

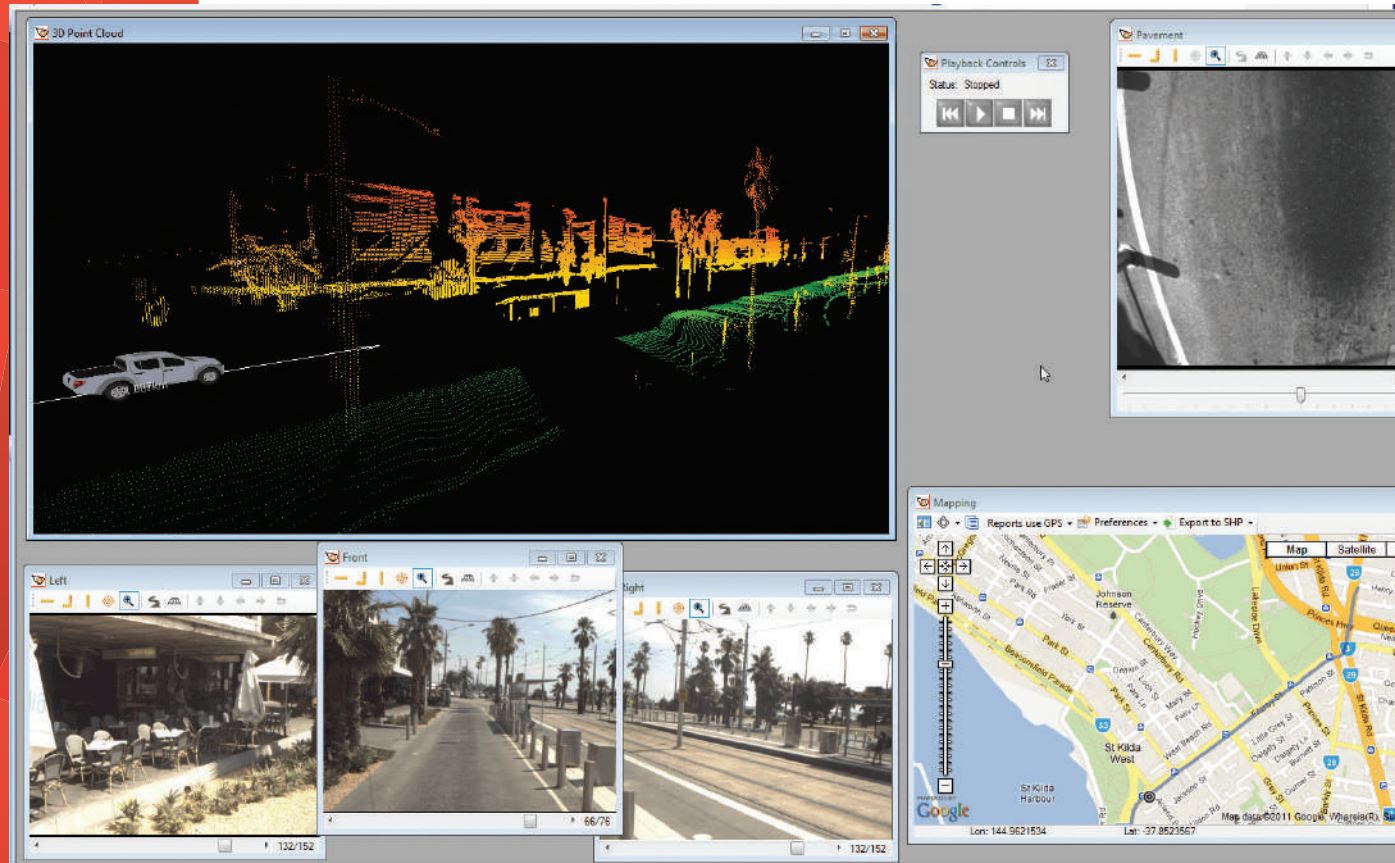
The Hawkeye 2000 Mobile Line Retroreflectivity package is a traffic speed device for measuring road line marking reflectivity. The LTL-M has been integrated into the Hawkeye platform to allow simultaneous collection of line reflectivity as part of general network surveys. This includes the measurement of night time visibility of both white and yellow road markings under dry and wet road conditions. It simultaneously measures the daylight contrast.

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.

Applications

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





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

Outputs

- 3D point cloud imagery
- Distance
- Hazard exception report
- Remission

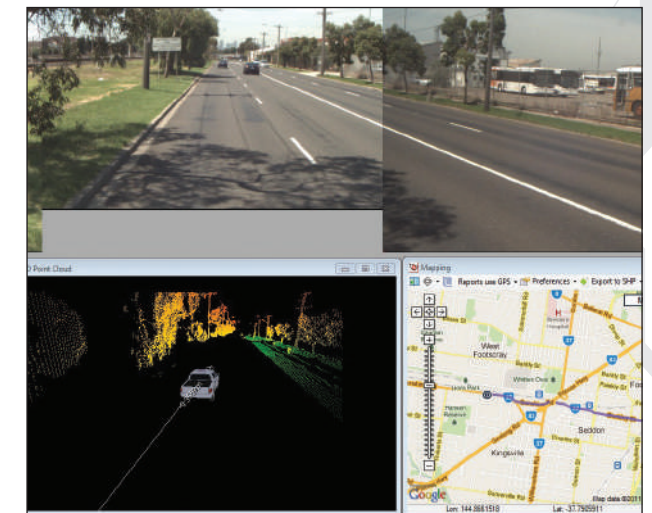
H2000 LIDAR ASSET DETECTION

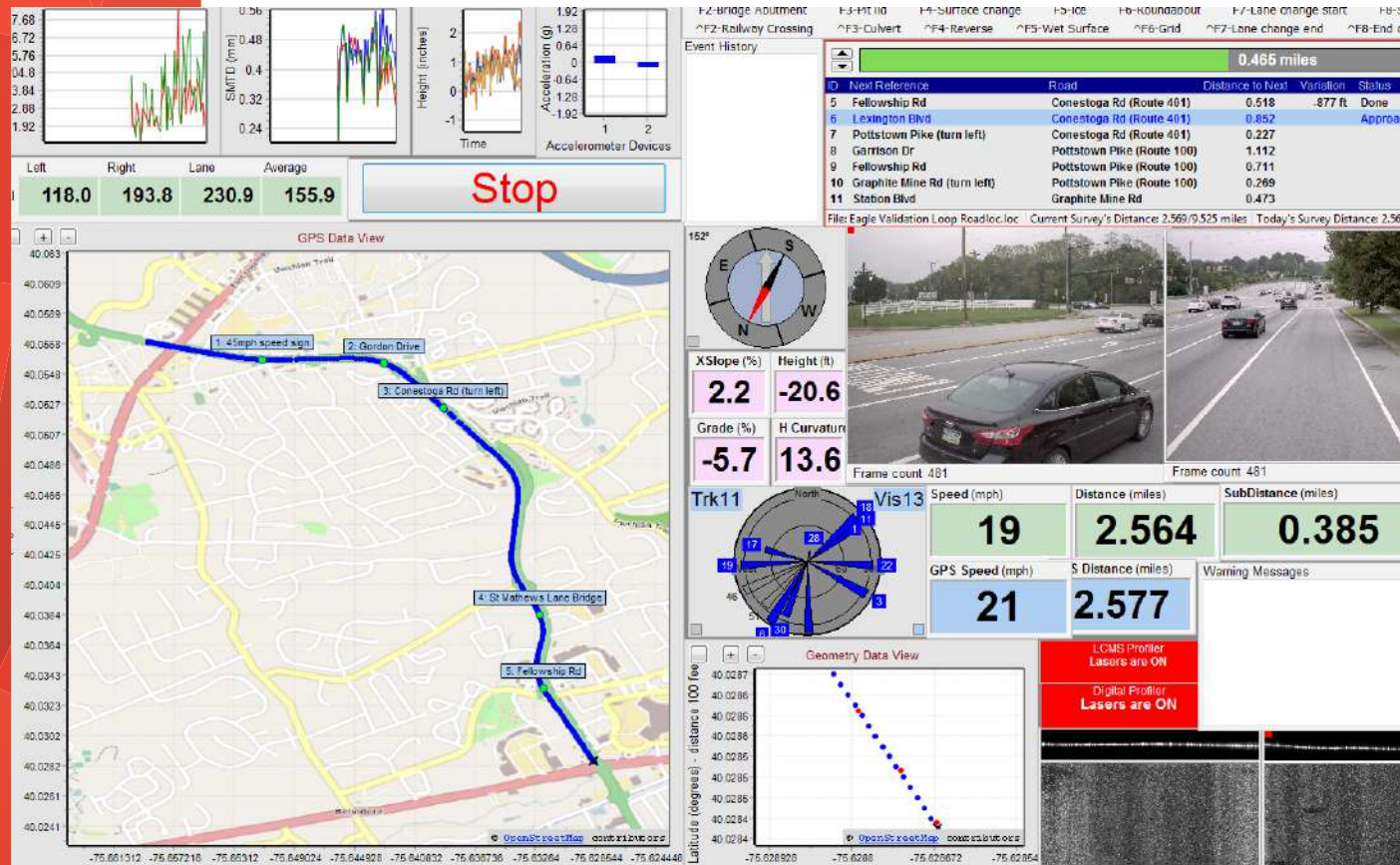
LiDAR technology has been common in geographical surveying for many years and is applied in similar ways to road surveying. The system uses a rotating laser that records distance to build up a three dimensional picture of the roadway and surrounds. LiDAR collects extensive point cloud information to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

Applications

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





Features

- Real-time Windows graphical user interface for management of multiple computer systems
- Customisable 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

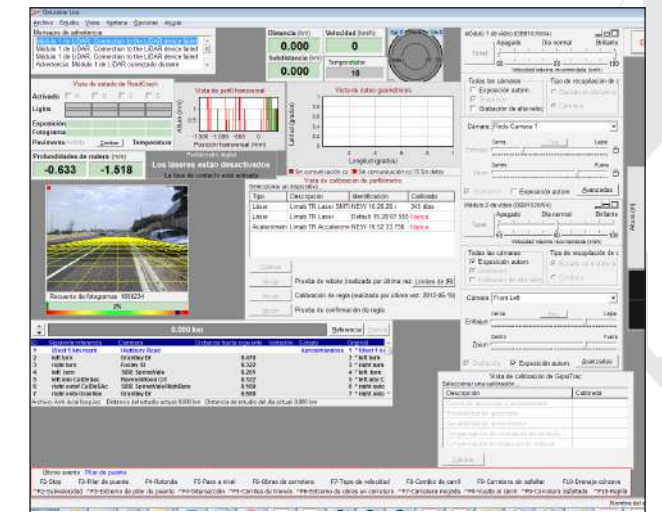
Capability

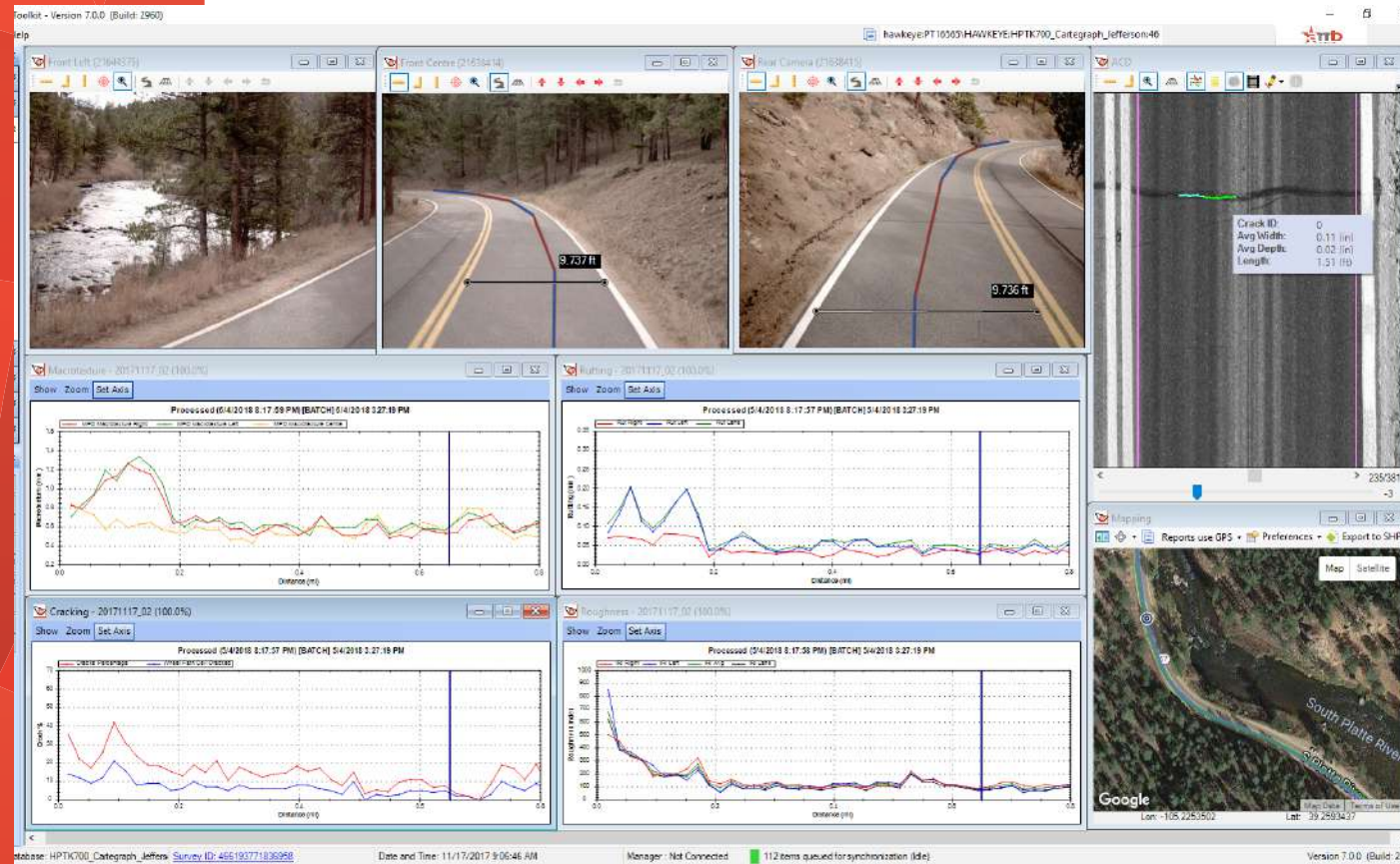
- Digital display of:
 - profilometry,
 - video imagery,
 - speed and distance
 - geometry
- Graphical display of:
 - GPS maps
 - inertial geometry mapping
 - road profile information
 - user defined survey notes tool

HAWKEYE ONLOOKER LIVE

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

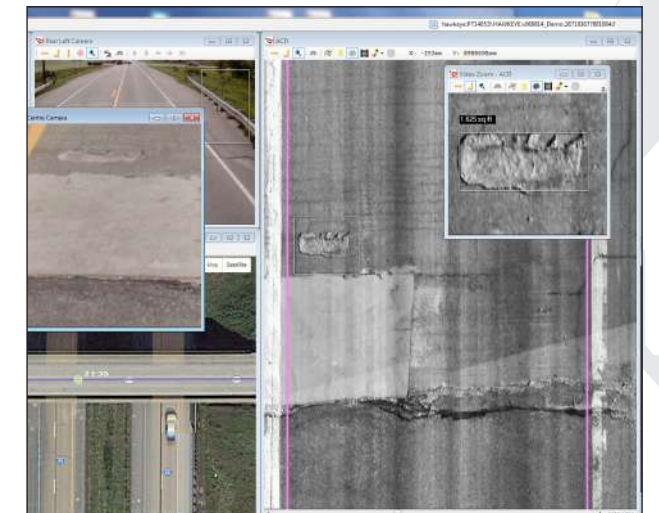
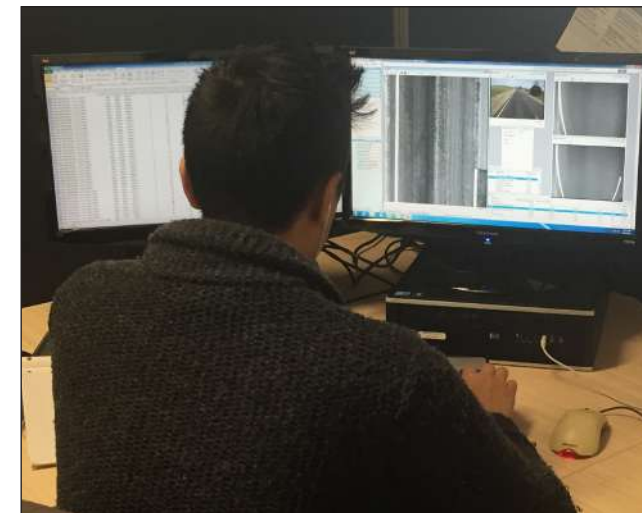
- Extensive analysis and reporting capability
- Advanced mapping interface that supports Google background maps
- Centralised databases to allow multiple users to process and view the same survey data simultaneously
- Multiple language support: English, Chinese, Spanish, Arabic and Russian
- Metric and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

Capability

- Calculation of:
 - International Roughness Index (IRI)
 - MPD and SMTD macrotexture
 - Rut index
 - 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 PROCESSING TOOLKIT

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.





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