Hawkeye 2000 Series

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

The Hawkeye 2000 Series is a highly specialized 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 synchronizes 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, utilizing the latest research and technologies, backed by ARRB Systems experienced support team.

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Hawkeye 2000 Series

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GNSS
GPS provides an accuracy of 5m-15m, while DGPS achieves real time sub-meter accuracy.

Automatic Crack Detection
Automatic detection of cracking and other surface defects.

Digital Imaging System
Capture images of road assets and pavement features.

Digital Acquisition system
Hawkeye Onlooker Live software is an interactive and real-time acquisition control interface that is capable of controlling and monitoring all of the Hawkeye systems simultaneously.

GIPSI-Trac 2 Geometry
Uses dead-reckoning sensors and dual GNSS antennas to collect position and road geometry information with sub-meter accuracy.

Digital Laser Profiler
Laser profiler accurately records the roughness and texture (MPD and SMTD) of the road surface.

Rotorpulser
Uses distance pulses from a sensor attached to a wheel of the survey vehicle to provide distance data.

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Automated Crack Detection

Highly accurate detection of cracks and other road surface defects.

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.
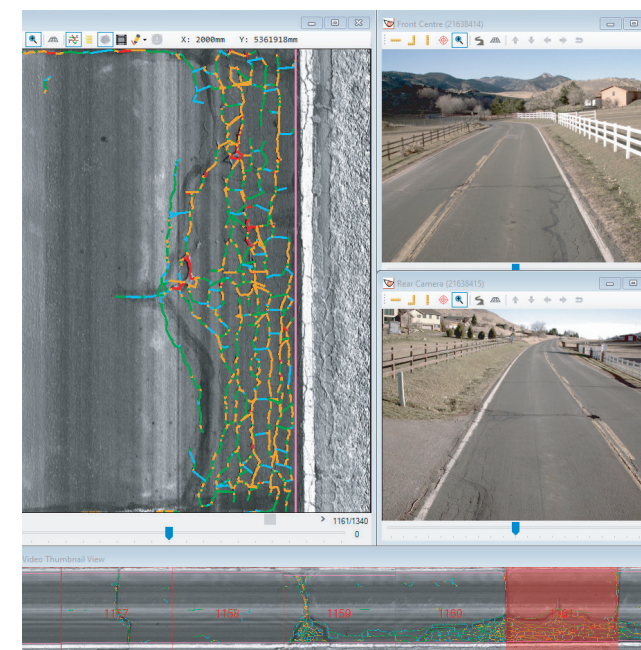
The unit projects a laser line onto the pavement and the image is captured by the 3D camera, allowing it to measure the transverse profile of the pavement to a very high vertical precision, combined with a 28kHz sampling rate it provides a high-resolution 3D scan of the pavement surface.

ARRB Systems own proprietary algorithms analyze, classify, measure and aggregate the cracking information into multiple formats and/or standards as required.

The flexibility of the Hawkeye software allows reporting of the type, severity, density, and extent of cracking, in a manner that meets the specific needs and/or standards of the user.

Applications

• Network-level pavement condition assessment.

• Accurate quality assessments for contractors.

• Routine pavement monitoring surveys.

• Contract validation.

Features

• Day and night operation, unaffected by shadows.
• Low power consumption.
• Data compression algorithms to optimize 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.
• Full lane width high resolution 3D scan.
• Full lane width transverse profile rutting.
• Full lane width crack and surface defect detection.
• Full lane width pavement imagery.
• Full lane width longitudinal profile roughness.
• Full lane width macrotexture.

Outputs

• ASTM, AASHTO, crack ratio and various other standard and custom cracking reports.
• Transverse Profile and Rutting.
• Longitudinal Profile.
• Roughness (International Roughness Index).
• Macrotexture.
• Lane marking.
• Pavement surfacing distress and deformations:
  - Ravelling, Bleeding, Potholes, Depressions, Shoving.
• High resolution pavement imagery.

Standards Compliance

• AASHTO R 87
• AASHTO R 88
• AASHTO R 55
• ASTM E950
• ASTM E965

Digital Laser Profiler

High-accuracy laser system providing a range of surface condition measurement outputs.

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 15 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 assessment for contractors.

- Baseline surveys and dilapidation.

- Contract validation.

Features

- Upgradeable to allow for the addition of more lasers.
- Rugged, but lightweight extruded 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.
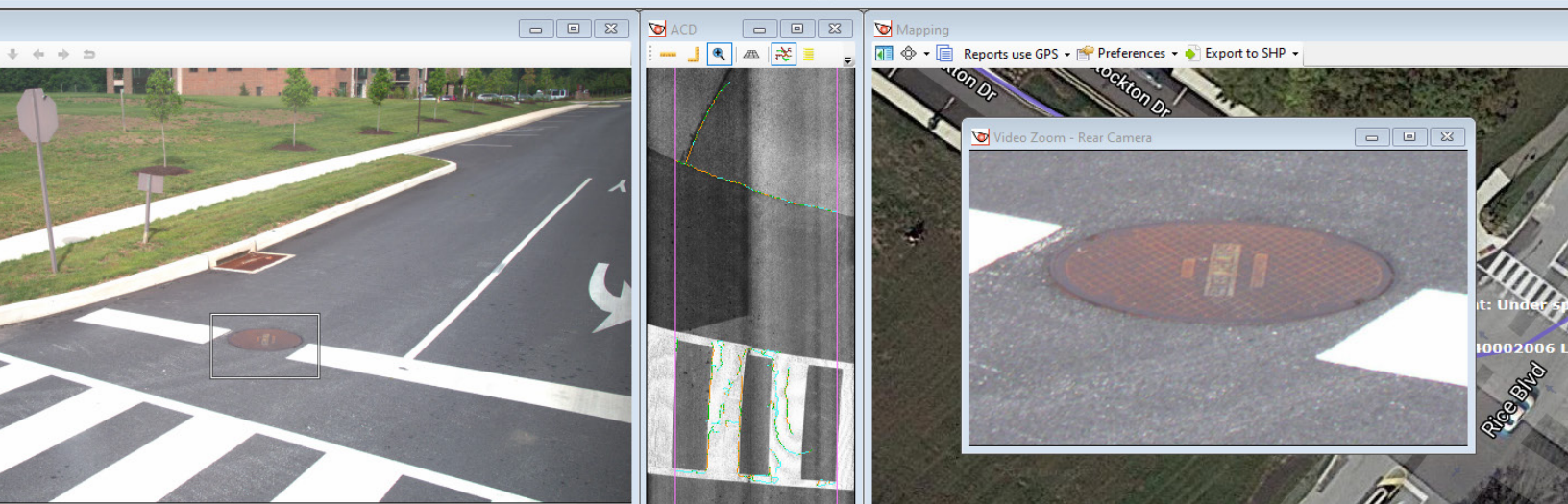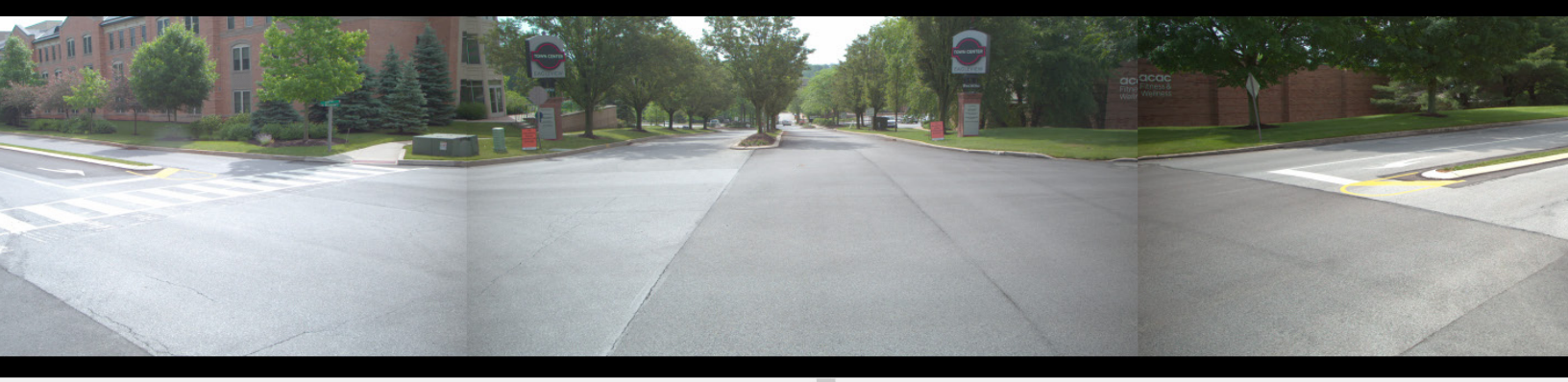- Data is linked to chainage and GPS coordinates.

Outputs

- Longitudinal profile in CSV, ERD, PPF formats.
- Advanced wavelength filtering options.
- Roughness (IRI, NAASRA, Ride Number, HATI).
- Macrotexture (MPD and SMTD).
- Rutting.
- GPS location.
- Distance.

Standards Compliance

- ASTM E950
- ASTM E1656: Class L111T1111C2221
- ASTM E1845
- ISO 13473-1
- EN 13036-5
- EN 13036-6: Class L1111T11111
- AASHTO M 328
- AASHTO R 43
- AASHTO R 54
- AASHTO R 56
- AASHTO R 57
- AASHTO R 86
- AASHTO R 87
- AASHTO R 88
- TMH 13 Part A,B,C,D,G
- AGAM-S001
- AGAM-S004
- AGAM-S005
- AGAM-S007
- AGAM-T001
- AGAM-T013
- AGAM-T018

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Features

- Provides continuous high-resolution, full-color 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.
- HD widescreen or 4K options.

Outputs

- Digital imagery in AVI and JPEG formats.
- Stitched multiple cameras super widescreen imagery.
- Distance.

Digital Imaging System

## Capable of visually identifying and locating roadside features.

The Hawkeye color cameras utilise the latest in digital image sensor technology in combination with high grade optics. Zoom and focus controls, along with software exposure algorithms optimized for on road image collection, produce crisp high-resolution images in all road conditions.

The calibrated cameras accurately log digital images of roadside assets against other parameters such as distance and GPS and allow for on-screen measurement and geo-referencing.

With various Field of View lens options, sensor resolution options of Full HD or 4K, and various and multiple camera mounting options, the image collection system can be tailored to suit any application.

Applications

- Visual identification of roadside features and assets.

- Right-of-way roadside condition assessment.

- Asset location for GIS applications.

- Road safety assessment.

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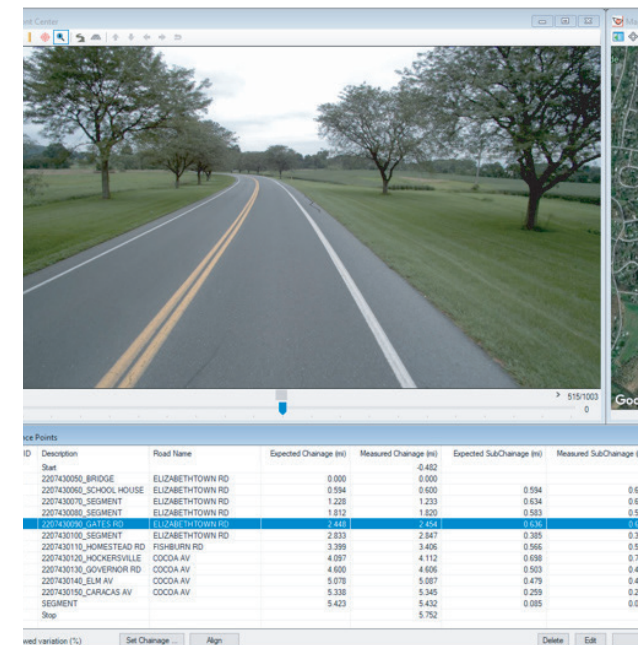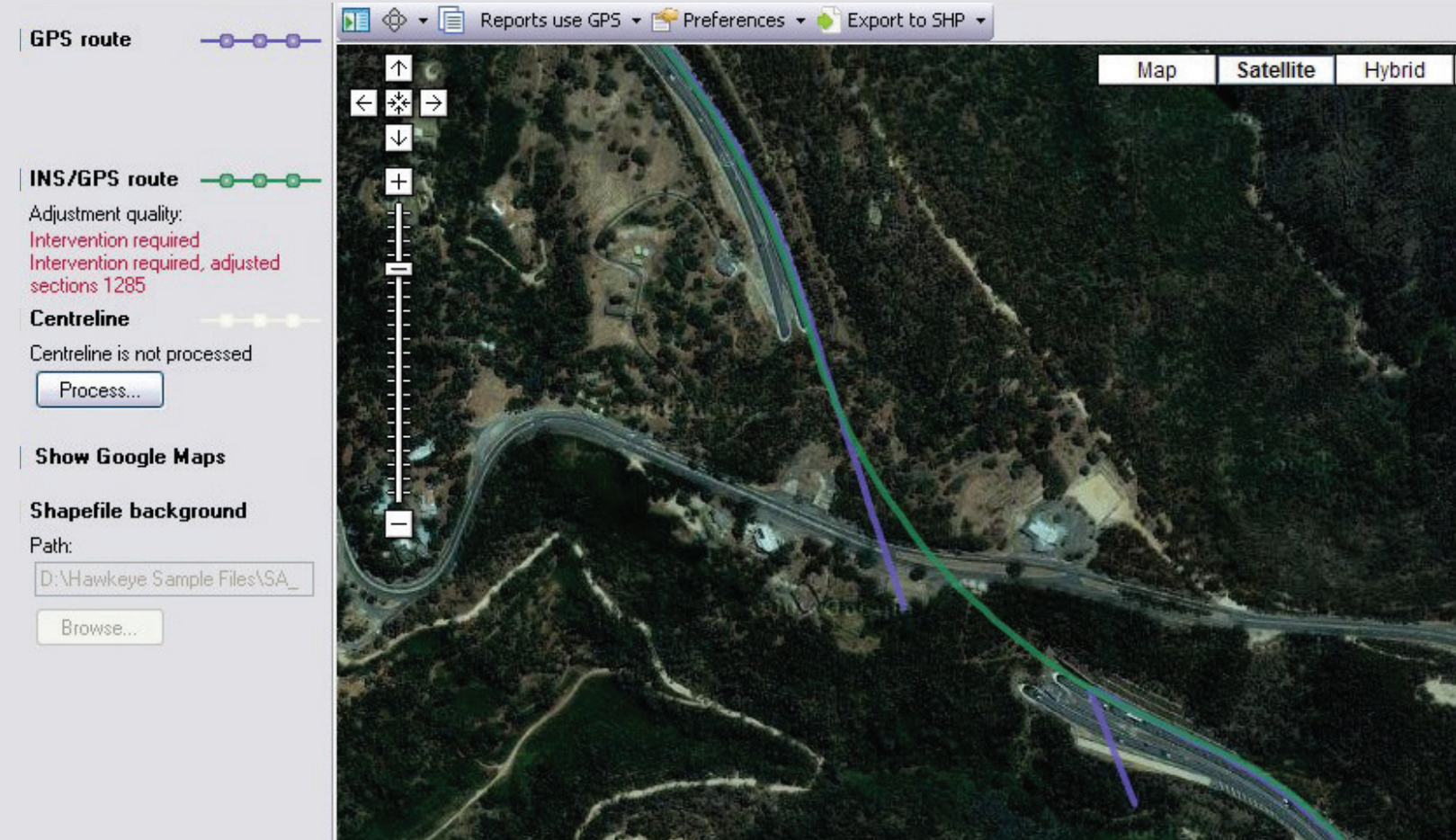
Features

- Uses an integrated dual antenna GNSS receiver and dead reckoning inertial sensors.
- 200Hz fused data output.
- Typical sub-meter or better mapping accuracy.
- Exports to CSV and point or polyline shapefiles.
- Operational at highway speeds to reduce survey time and costs.
- Fully customizable GPS projection methods:
  - Lat, Long, Easting, Northing and a range of datums.
- Supports Universal / Transverse Mercator.
- Supports Base Station Kinematics.
- Operates with high accuracy 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.

Gipsi-Trac2 Geometry

The next generation geometry module, boasting dual antenna GNSS receiver and dead-reckoning inertial sensors.

The GIPSI-Trac 2 is the next generation GNSS + INS (Global Navigation Satellite Systems + Inertial Navigation System) geometry module.
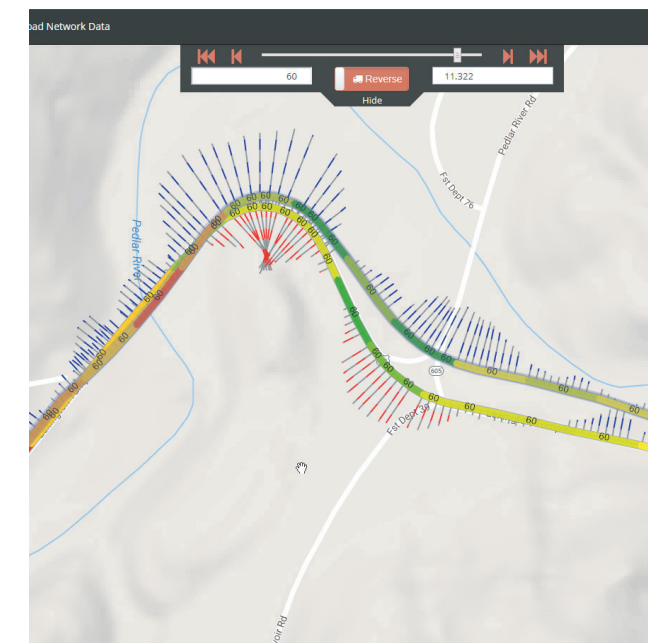
With a high update rate dual antenna receiver, linking to all the various worldwide GNNS constellations, as well as various Space Based Augmentation Systems (SBAS) like Omnistar, allows the GIPSI-Trac 2 to provide high accuracy and reliable real-time spatial positioning during a high-speed surveys anywhere in the world.
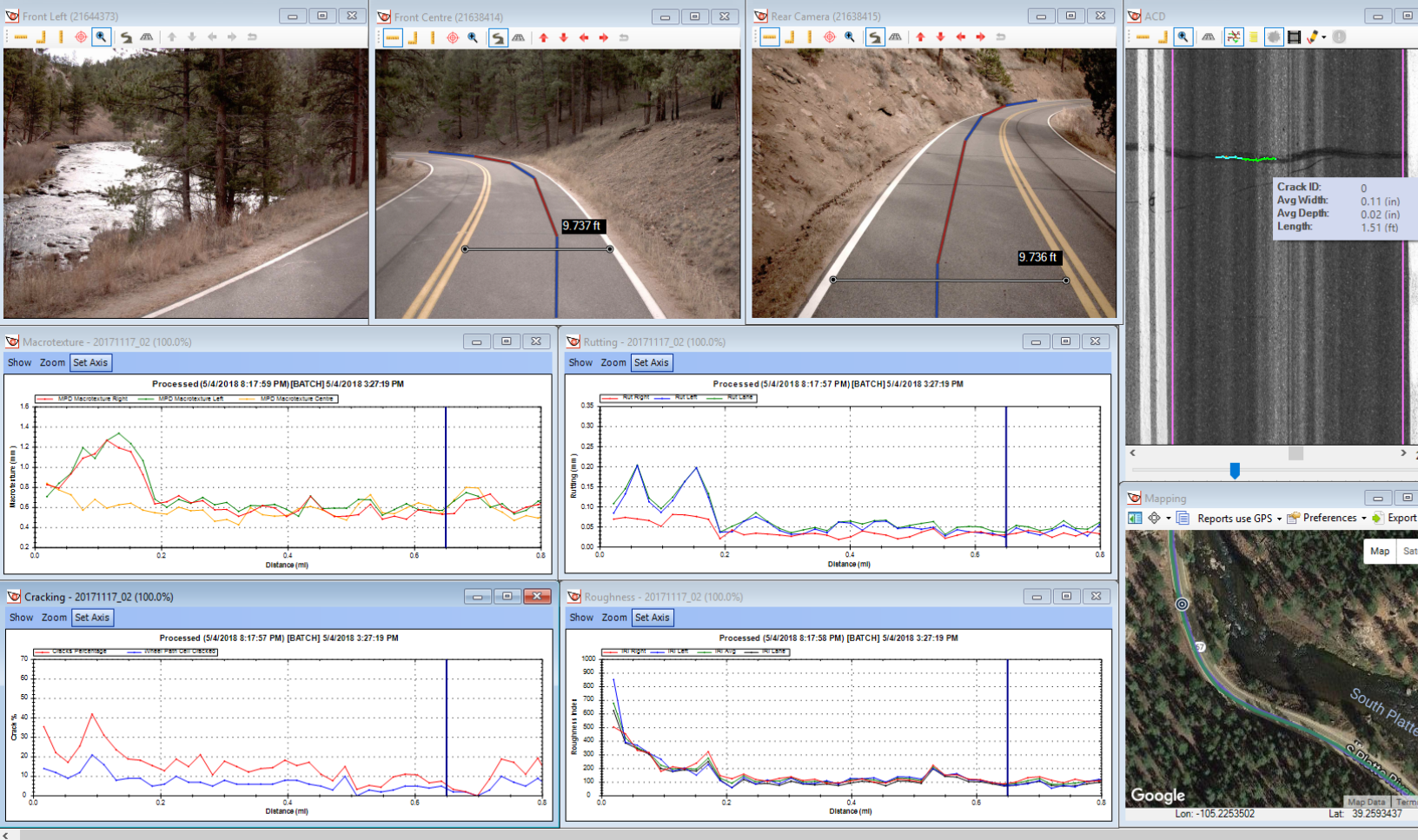
It also boasts real-time fused GNSS/INS, where the system records and combines inertial data from a 3-axis gyroscope, 3-axis accelerometer and a distance sensor with the dual antenna GNSS positional information.

This built-in dead-reckoning allows for highly accurate positional data to be recorded in all conditions, even when in tunnels, under bridges, and locations with little or no GNSS coverage, with no post-processing required.

Applications

- Road geometry and measurement.

- Mapping.

- Conformance to pavement specifications.

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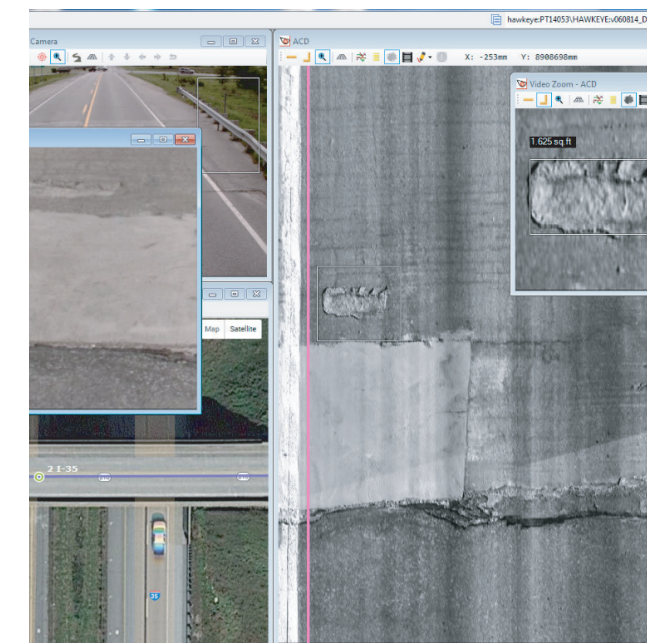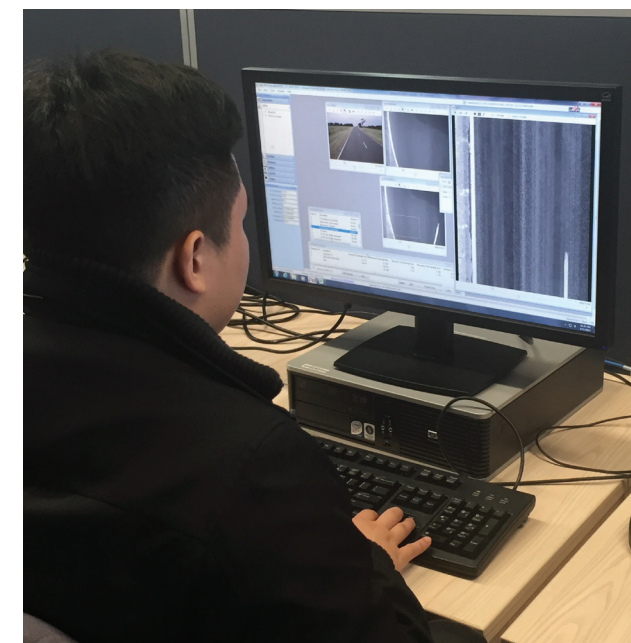
Hawkeye Software Suite

The easy-to-use Hawkeye interface allows the user to monitor data collection, then process, analyze and review all collected survey parameters.

The Onlooker Live acquisition software runs on a dedicated computer in the vehicle, allowing for a fully customizable layout to suit individual operator requirements. The network control interface enables real-time result reporting and the capability to progressively add new Hawkeye modules, without the need for additional software.

The software utilizes survey navigational tools such as compass, location reference points, maps and recording of events. Computer generated speech can be enabled for system warnings and other items requiring attention.

The Processing Toolkit software can calculate various outputs such as IRI, MPD and other with standard and custom processing parameter settings.

Advanced image analysis tools can be used to review and rate individual video frames against distance 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.

Processing Toolkit Features

- Extensive analysis and reporting capability for profile, texture, geometry and imagery assessment.
- Advanced mapping interface that supports Google background maps.
- Centralized 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.
- Data compression algorithms to optimize storage.
- Batch rubber banding and editable reference points.
- Survey search filter capability.
- 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 (64-bit) compatible.

Capabilities

- 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.

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