



Engineering Survey with GeoAutomation

McElhanney Consulting Services Ltd.

December 21, 2010

Engineering Survey with GeoAutomation

GeoAutomation is a mobile digital imagery camera system, providing near 360°, survey-enabled, georeferenced imagery capable of mapping accuracies ranging from GPS quality through to the high accuracy survey requirements demanded in Engineering Road Design. With 14, 2MP, digital cameras, this totally optical system is an excellent tool for: Asset Inventory Collection and Management; Pavement Condition Assessment; Topographic mapping data collection; Engineering quality surveys; and 3D modelling.

(Readers are encouraged to examine the “Introduction to GeoAutomation” White Paper before reviewing this document.)

This Paper describes how GeoAutomation imagery can be used in creating the Engineering Design plans for a road redesign project. While this Paper focuses on road redesign projects, the information in this document is equally applicable to most civil engineering projects.

The Problem:

Engineering grade survey requirements for road re-design projects are always time consuming, expensive and subject to the vagaries of weather. They can be serious headache for Project Management in terms of work flows and project time lines. Delays in survey collection can cause exponential delays further down the project cycle. Additionally, the logistics of planning acquisition and every day safety concerns for the on-road surveyors are constant concerns for all Survey Crew Chiefs.

The Solution:

Utilize GeoAutomation imagery.

With GeoAutomation imagery the vast majority of the survey work is transferred from the field to the office. The office ‘survey’ work has the following immediate benefits:

- Data collection is not subject to weather delays.
- Data collection can be performed by GIS Technicians.
- Data collection can be performed around the clock.

GeoAutomation imagery for Engineering Design survey work requires the additional of targeted ground control along the route. For 2cm accuracy imagery targets are required every 20m – 25m along the route, in a zig-zag manner. On a 10 km stretch this equates to 400 – 500 targets placed and measured.

A typical 10 km road redesign project may require cross sections every 15m to 20m, with perhaps 12 surveyed points per cross section. At 15m, this equates to 8000 surveyed points. Additionally, topographic features along the route are often collected, adding thousands of additional points and line strings to be surveyed in the field.

From a **Risk Management perspective**, which would you rather have? Survey crews out for few days collecting 500 points, or the same crews out for several months collecting +10,000 points? There is no doubt that introducing GeoAutomation imagery would vastly improve the safety margins on any project.

From a **Project Management perspective**, the ability to do the survey and data collection work in the office provides the Project Manager with the flexibility to better accommodate negative schedule impacts from other sources. It also frees up the surveyors for additional survey tasks or for projects that are not suited for GeoAutomation survey.

Our experience is that, in one 8-hour shift, the collection of topographic data, for engineering grade road design work, 600m to 1600m of data can be collected. Compare this to your own production rates, or to the industry standard of 300m per day (for a two man survey crew), and you can immediately see the benefits. Time savings are similar in the generation of cross sections.

What Project Manager wouldn't welcome the ability to introduce this amount of flex time into his schedule?

From a **Cost perspective**, the price of the GeoAutomation imagery and software has to be taken into account. With the exception of very small projects, 1km – 2km in length, the cost of the GeoAutomation imagery solution is less than or comparable to the traditional field survey approach. And when the added value of the GeoAutomation imagery is factored in, the value to a project of any length rises substantially.

From an **Added Value perspective**, the GeoAutomation imagery solution gives clients so much more. Just as in the traditional field survey approach, clients are provided with a digital and hard copy of all plans along with survey coordinates. However, with the GeoAutomation solution, the imagery and software are included! With GeoAutomation imagery clients are able to:

- Virtually visit any part of the project route, at any time.
- Measure, examine, verify and collect, or map, as much data as they want, at no additional expense.
- Utilize the imagery for pre construction road condition inventory.
- Utilize the imagery as a 'virtual' As Built.
- Create additional products from the data rich imagery. These include 3D models; DTM surfaces; line of site views; and slope analyses.

About McElhanney Consulting Services Ltd.

For over 100 years, McElhanney has provided innovative engineering solutions to municipal, provincial, federal, transportation, and construction clients. With offices in BC, Alberta and Indonesia, we are a multi-discipline consulting firm, offering a complete range of integrated services to answer all your engineering, surveying, planning, mapping and environmental needs.

McElhanney – proud of our success. Proud to help build our communities.

For additional information on GeoAutomation from McElhanney please contact:

Paul Currie,

Business Development Manager, Mobile Mapping

(o) 604 - 694-2259

(c) 604-812-7603

pcurrie@mcelhanney.com

Or visit: <http://www.mcelhanney.com/mcsl/products/geoautomation.php>

Additional White Papers on GeoAutomation from McElhanney:

- Introduction to GeoAutomation
- Asset Inventory and Topographic Data Collection
- 3D Modeling
- Engineering Survey
- Pavement Condition Assessment
- Virtual As-Builts