Pictometry and Trimble's Indoor Mobile Mapping System (TIMMS): A Case Study in Fast, Accurate, Directly Georeferenced Indoor Model Production

Pictometry® (www.pictometry.com) is an innovative airborne surveying and mapping company, and inventor of geo–referenced aerial oblique imaging. Now, using the Trimble Indoor Mobile Mapping Solution (TIMMS) from Applanix (www.applanix.com), Pictometry is merging indoor georeferenced data with its unparalleled library of geo–referenced aerial imagery for a total, 360° solution called Critical360™.

Background

Since inventing geo–referenced aerial oblique imaging in 2000, Pictometry International Corp. has redefined the global standard for visual–centric data analytics, integration, and reporting. Professionals across government agencies and commercial market segments use Pictometry's patented technologies daily, overlaying GIS data on images and integrating existing systems to enhance productivity, gain unique insights, and change lives. With over 35 million images added annually to its cloud–accessible servers, the Pictometry's unparalleled library now contains more than 274 million images–each mapped to the individual pixel.

To help produce all this georeferenced imagery, Pictometry turned to Applanix, the original pioneer of Direct Georeferencing– the most efficient and cost–effective method of georeferencing airborne data available. Direct Georeferencing is the geocoding of data from a camera, or other sensor, by directly measuring its position and orientation relative to the earth. These measurements are derived by integrating position information from the Global Navigation Satellite System (GNSS) with acceleration and angular rates measured with an Inertial Measurement Unit (IMU).

The TIMMS cart performed as we hoped. We captured over 90 buildings quickly and accurately. The Applanix team was very knowledgeable in the data capture techniques and trained our staff so that we were able to complete the last several buildings of the project ourselves.

– Scott Sherwood, VP at Pictometry

Pictometry is merging its unparalleled library of geo-referenced aerial imagery with indoor georeferenced data collected with TIMMS for a total, 360° solution called Critical360™

The Applanix **POS AV** (**P**osition and **O**rientation **S**ystem for **A**erial Vehicles) is specifically designed for directly georeferencing airborne sensor data. By integrating precision GNSS with inertial technology, POS AV enables geospatial projects to be completed much more efficiently and economically. It is engineered for use with aerial cameras, lidar, hyperspectral and thermal imaging sensors, and synthetic aperture radar technology.

Pictometry purchased their first POS AV 15 years ago and have been flying Applanix technology ever since in their large fleet of aircraft – currently at 78 planes and increasing soon to 93.

According to Scott Sherwood, VP of Sales Enablement at Pictometry, when it came to expanding their image library to include and integrate indoor spaces, Applanix was a proven partner and a supplier to immediately consider. "The Applanix POS AV is very robust and has worked very well for us in the past. When we decided to pursue collecting and merging interior data with exterior data for the Critical360™ platform – a service offering that connects Pictometry users to a comprehensive resource of visually organized interior and exterior building and property information – Applanix and their technology was an obvious contender. We investigated several products and companies, looking for the "best–of–breed" solution to meet our needs. The biggest factor in choosing Applanix – speed of capture."

Pictometry Chooses Applanix, TIMMS for Directly Georeferenced Indoor Imagery for their Critical360™ Web Platform

In an emergency situation, accurate intelligence is critical. Critical360 connects Pictometry users to accurate, georeferenced, visually organized interior and exterior building and property information. From public safety and emergency responders to operations, administrative and facility management professionals, Critical360 users can quickly, easily and intuitively view up–to–date locational information.

Critical360 technology powers searches, queries and the location availability for critical resources and structural details. With accurate floor plans pre–generated by professional technicians, it provides 360–degree images of building interiors. When combined with Pictometry geo–referenced aerial imagery the power of Critical360 and Pictometry® Intelligent Images® can save lives:

- Search building interiors
- Locate resources
- Pre–plan for crisis scenarios
- Train using actual information
- Have a continually up–to–date one stop resource of information
- In an emergency make stronger, more informed and perhaps lifesaving decisions
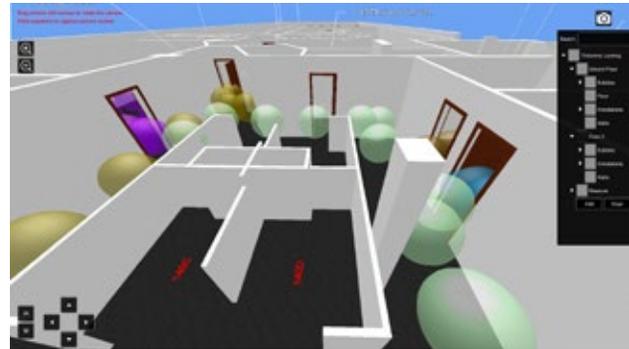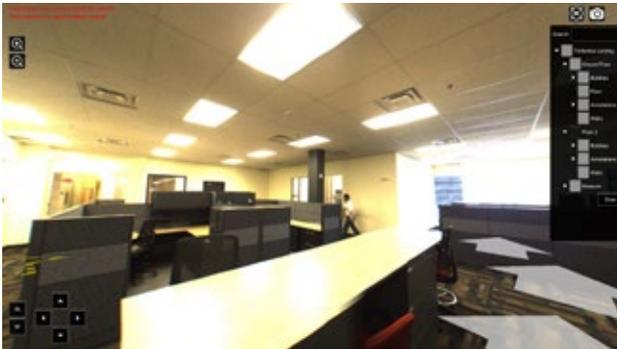
Mapping 91 building interiors (millions of square feet!) for the Regional Municipality of Wood Buffalo, Alberta, Canada

The Regional Municipality of Wood Buffalo is a specialized municipality located in northeastern Alberta. Formed as a result of the amalgamation of the City of Fort McMurray and Improvement District No. 143 on April 1, 1995, it is the second largest municipality in Alberta by area. It is home to vast oil sand deposits, also known as the Athabasca Oil Sands, helping to make the region one of the fastest growing industrial areas in Canada. As a longtime customer, Wood Buffalo turned to Pictometry for much needed, up–to–date, and accurate 3D floor plans and models of almost 100 public buildings. This included all schools, public offices, airports, arenas, colleges, and industrial locations such as water treatment plants. Some buildings were very small, others very large with many floors and staircases.

"Using the old way – manually tying images together – this project could not have been completed. It simply would have taken too long. We needed a new way," said Scott Sherwood. After researching all available options, TIMMS and Applanix were chosen.

TIMMS combines technologies for capturing spatial data of indoor and other GNSS denied areas. It provides both LiDAR and spherical video, enabling the creation of accurate, real–life representations (maps, models) of interior spaces and all of its contents; every object in the interior space – including desks, chairs, stairs, and doors – appear in the plan. The maps are geo–located, meaning that the real world positions of each area of the building and its contents are known.

Because of its tremendous efficiency and speed, TIMMS is very effective for facilities of all sizes, shapes and purposes.

Results

The data capture work was performed by an Applanix operator using the TIMMS cart. Simply a matter of walking the cart through the entire floor space, several buildings could be completed in a single day.

Highly accurate digital 3D blueprints of 91 different government buildings, with exact distances and measurements of every single room, closet, hallway and doorway in the structure, were created. Models of building interiors were then created using Sketchup 3D modelling software and made accessible to Pictometry by Applanix on the Trimble Connected Community (an online information management system that uses web–based tools to make sharing data and managing projects easy). Final results were then made available to Wood Buffalo through the Pictometry Critical360° web platform.

"The project was definitely a success and Pictometry is actively selling this indoor modeling service. We believe this is an important new business for us," said Scott Sherwood.

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Applanix Corporation
85 Leek Crescent
Richmond Hill, ON
L4B 3B3, Canada

www.applanix.com
land@applanix.com
Tel: +1.905.709.4600
Fax: +1.905.709.6027