The Most Comprehensive Ground Control Points Solution

Make Geospatial Data More Accurate
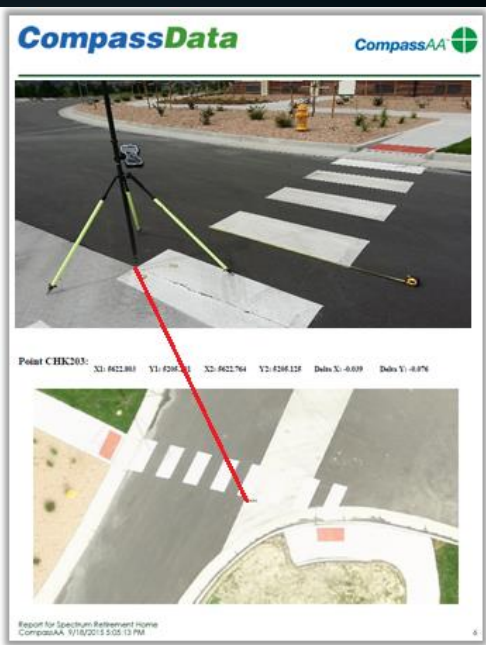
Ground Control Point
- Field Survey
- Remote Sensed
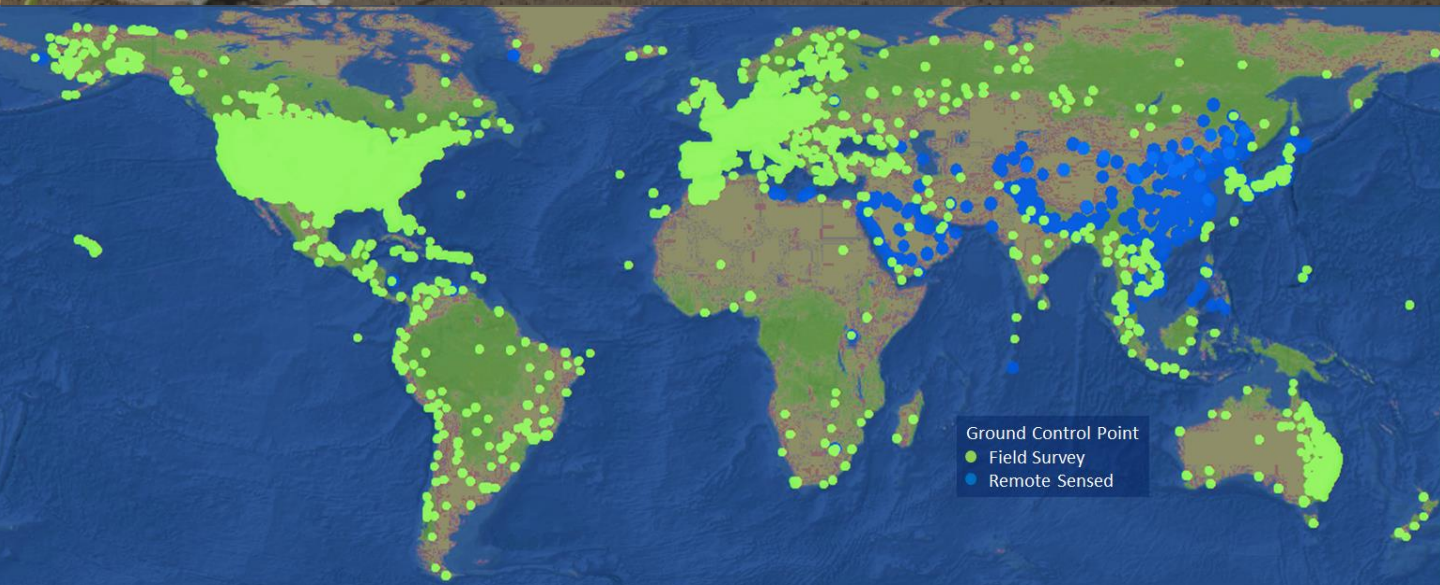
+50,000 Archived GCPs

HOW GCPs Are Created?

Ground Control Points (GCPs), are points on the ground which are generally photo-identifiable (e.g. a sidewalk corner or other high contrast feature), that have been surveyed to within centimeters of their true location.

Without ground control, accuracies for non-orthorectified, satellite images are typically 10-200 meters off, based on look angle and terrain displacement.

Once GCPs have been applied, those accuracies can improve to under 2 meters, depending on the digital elevation model used in orthorectification.

GCPs are used to apply the precise Latitude, Longitude and elevation values surveyed on the Earth to the pixel locations within the imagery (or data) being processed.

Network Adjustment Report

Simple in application, but complicated to survey, post-process, and deliver consistently to ISO 9001 and DO-200 (FAA) quality standards. It starts with planning and logistics to get a surveyor in place to collect up to 2 hours of GPS satellite data (depending on location, and regional GPS infrastructure).
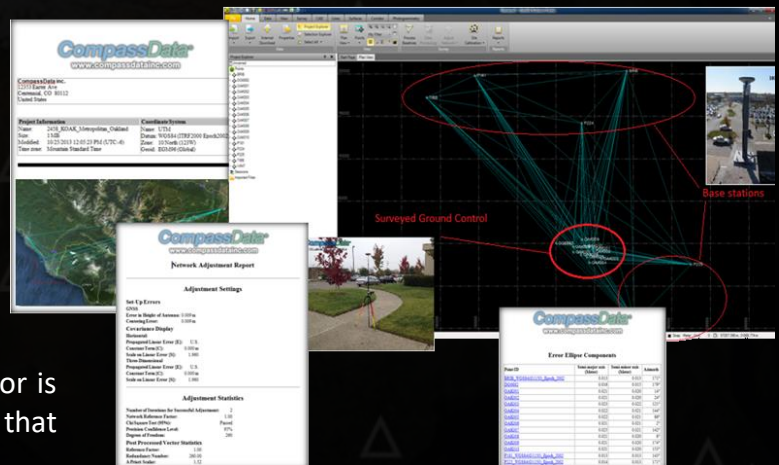
GCP feature selection by the field data collector is critical; he is responsible for locating points that will have good longevity.

A good GCP is also usable for all scales of imagery, from 6-inch pixels to 2 meter pixels. The ideal GCP is collected on a well defined angle of a large, high contrast feature. The better the GCP feature, the more imagery and data types the GCP will be visible within.

When is Submeter Accuracy Required?

With the growing constellation of commercial earth-observation satellites, there has been an explosion of spatial data in our everyday lives. Once the realm of surveyors and rocket scientists, Global Positioning Satellite (GPS) technology is now in our automobiles, wrist watches, and cell phones, and is becoming increasingly tied to data, be it a satellite image of the Earth or the map location of the restaurant we just made reservations with while stuck in traffic.

How does the satellite image and internet map display the restaurant within meters of its real location? GCPs. GCPs were used to geolocate the satellite image and the map that was digitized from the image and displayed in the application.
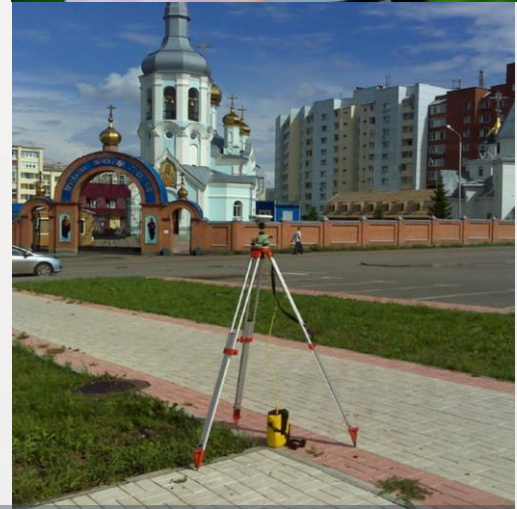
This positional accuracy will become even more critical as we enter the age of driverless vehicles.

GCPs: Essential Foundation for Geospatial Accuracy

- Planimetric (GIS) Mapping
- Urban Planning / Engineering
- Natural Resource Management
- Utility Mapping
- UAV Navigation
- LiDAR and IFSAR Surface Models
- Image Orthorectification
- Airport Mapping Databases
- Sensor Calibration
- Surface Elevation Mapping
- Driverless Vehicle Navigation
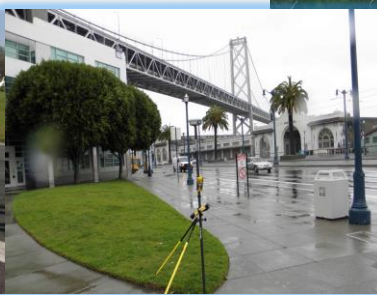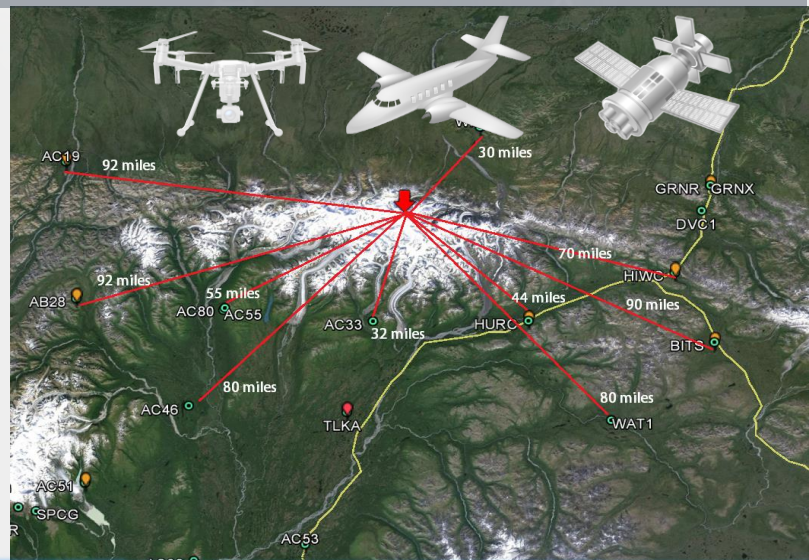
Certified Quality Processes and Standardized GCP Deliverables

GCP field photo, Tabriz, Iran

Excellence

Per ISO and FAA certified quality processes, CompassData strives to meet and exceed the customer's end project requirements:

- GCP survey planned to capture best suited feature types (photo-identifiable, LiDAR specific, permanent or temporary features)
- Accuracy tailored to end product accuracy requirements, see *GCP Specifications*
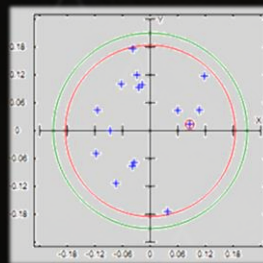- Optimized density and distribution of GCPs

Round_Lat	Round_Lon	HAE	MSL	Date	Accuracy	hAcc	vAcc	Datum	Location
29.68	-90.78	-23.982	2.62	11/28/2017	Quality-1	0.02	0.021	WGS84(ITRF2008 epoch 2005)	Gray
29.41	-90.61	-25.672	0.331	11/28/2017	Quality-1	0.023	0.02	WGS84(ITRF2008 epoch 2005)	Chauvin
29.61	-90.73	-25.518	0.933	11/21/2017	Quality-1	0.014	0.016	WGS84(ITRF2000 Epoch 2002)	Houma

- Coordinate file containing Lat/Long and Elevation with data translated to the desired spatial reference and coordinate system
- Project Report (optional) containing information on:
    - Equipment used in data collection
    - Survey procedures
- Post processing Accuracy Report
- Image Chip showing GCP location
- Field Station diagram (sketch)
- Digital pictures of the GCP location, from
    - each cardinal direction
- Google Earth KML and ESRI shapefile of GCP locations

DOE 200 Certified

Circular Error

Quality

Quality 01 Premium	Accuracy from 1cm/Δ H X 3cm/Δ V to 5cm/Δ H X 5cm/ΔV. With CompassData's Quality 1 data a customer receives photo identifiable Ground Control Points with Accuracy from 1cm/Δ H X 3cm/Δ V to 5cm/Δ H X 5cm/ΔV.
Quality 01	Accuracy from 1cm/Δ H X 3cm/Δ V to 10cm/Δ H X 10/ΔV. With CompassData's Quality 1 Premium data a customer receives photo identifiable Ground Control Points with Accuracy from 1cm/Δ H X 3cm/Δ V to 10cm/Δ H X 10cm/ΔV.
Quality 02	Accuracy of 20cm/ΔH X 20cm/ΔV or better. With CompassData's Quality 2 data a customer receives photo identifiable Ground Control Points with an Accuracy of 20cm/ΔH X 20cm/ΔV or better.
Quality 03	Accuracy of 50cm/ΔH X 75cm/ΔV. With CompassData's Quality 3 data a customer receives photo identifiable Ground Control Points with an Accuracy of 50cm/ΔH X 75cm/ΔV.
Quality 04	Accuracy of 70cm/ΔH X 1.25m/ΔV. With CompassData's Quality 4 data a customer receives photo identifiable Ground Control Points with an Accuracy of 70cm/ΔH X 1.25m/ΔV.
Quality 05	Accuracy of 2.5m/ΔH X 5m/ΔV. With CompassData's Quality 5 data a customer receives photo identifiable Ground Control Points with an Accuracy of 2.5m/ΔH X 5m/ΔV.

RSGCP®: Remotely Sensed GCP

In remote or denied areas where on-ground GPS surveys are not possible, CompassData produces Remotely-Sensed GCPs (RSGCP®). Satellite based synthetic aperture radar (SAR) sensor combined with an extremely precise on-orbit platform are used to generate photo identifiable GCPs with an accuracies of less than or equal to 1m guaranteed.

CompassData offers Remotely Sensed Ground Control Points (RSGCP™), providing control for those areas that are restricted, too remote, or too dangerous for field data collection.

The Remotely-Sensed GCP data are delivered to the customer in the same fashion as CompassData terrestrial GPS control points, including:

- Coordinate file
- An Image Chip corresponding with the SAR Image Chip for the control point

- Metadata file in CSV format
- SHAPE file for the Area of Interest
- KML file for viewing in Google Earth™
- An Accuracy Report and a Site Sketch providing additional details regarding the RSGCPs

Quality

RS-1 Precision	Based on 3-4 High Resolution "SpotLight" scenes, 5 GCPs at <=1m accuracy can be generated within an area of 20 km2
RS-2 Precision	Based on 2 Strip Map scenes, 8 GCPs at <=3m accuracy can be generated within an area of 1,000 km2