

Collector for ArcGIS: Working with High Accuracy Data

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Agenda

- Introduction
- Getting started
- Collector setup for high accuracy data collection
- Field data collection process
- Using offsets to capture features
- Additional Tools
- Q&A





Collector for ArcGIS

Accurate data collection made easy

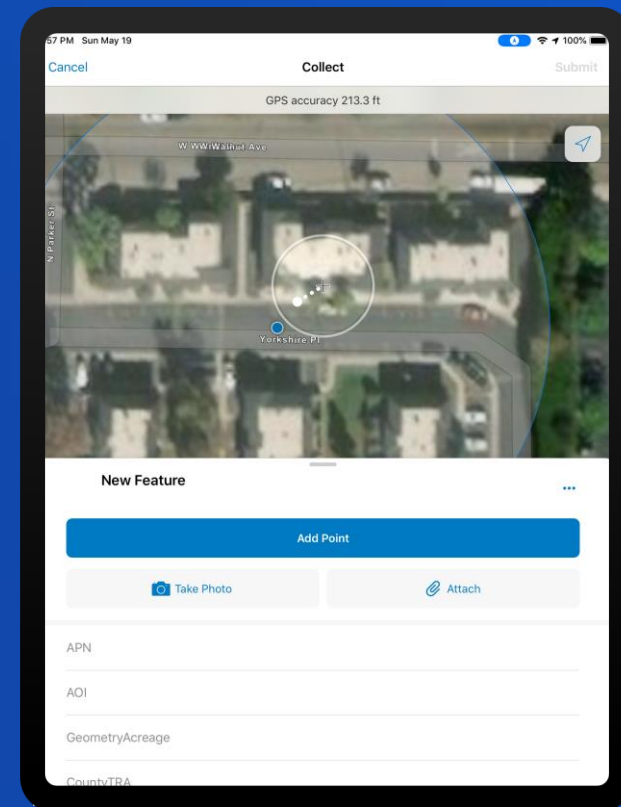
Capture

Perform data collection and send it back to the office from anywhere

Efficient data collection

Works anywhere, anytime

High accuracy location capture



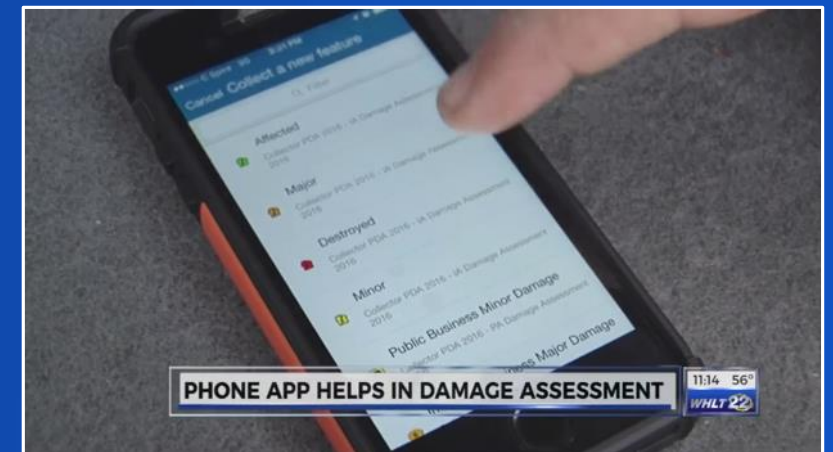
Collector| How is it being used?



Collect and Maintain Asset Data



Capture Observations



Perform Field Assessments

Collector| High Accuracy GPS

- Easy to use
- Efficient with processing on the fly
- Confident with GPS metadata fields for individual asset



Seattle Zoo Infrastructure Mapping



City of Centennial and CH2M
Public Works Asset Collections



Project RockTheAlps (RTA)
Rockfall location collections

Collector for ArcGIS | Control Points Use Cases (Drones)



Control Points + Drone Flight Path + Orthomosaic



Collector + RTK



Drones...

What's new in Collector for ArcGIS

- Configure RTK settings directly within Collector for Trimble receivers (iOS only)
- Support for grid based transformations in the Location Profile
 - Includes sideloading grid files onto the device directly or downloading the grid files from ArcGIS Online
- Enhanced support for capturing elevations
 - Z values stored with the feature geometry
 - Capture orthometric heights with Eos Tools Pro app
 - Visualize current GPS altitude inside the GPS details
- Improved UI for high accuracy workflows
 - Improved user feedback when capturing outside required accuracy
 - Visualize point cloud in the map during averaging workflow



Getting Started

Considerations for high accuracy data collection



Data Collection Considerations

- Project accuracy requirements
- Supported receivers
- Correction services
- GNSS Metadata
- Desired basemap for collection
- Datum transformations

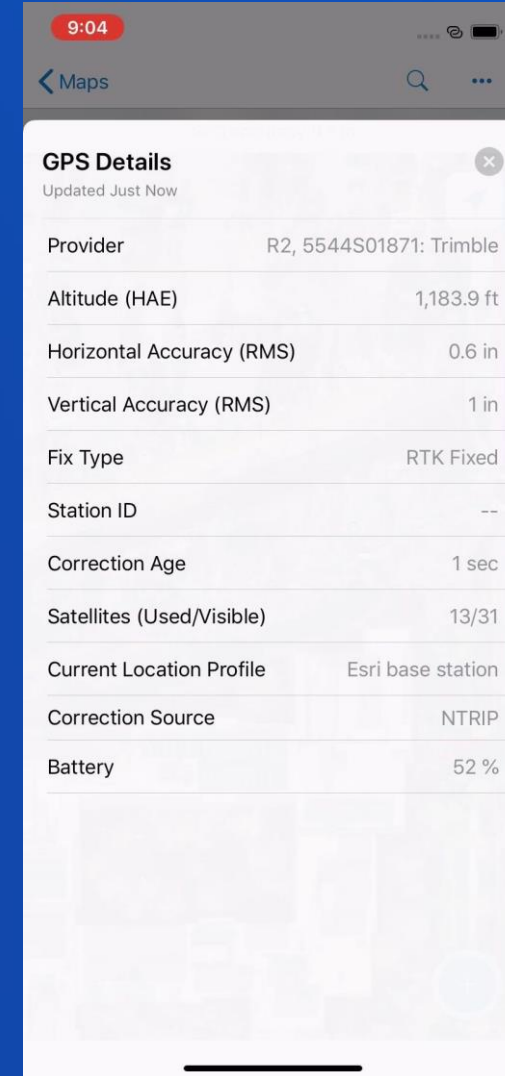


Collector for ArcGIS| Lots of Receivers



Collector | Using Real-time Differential Corrections

- Improve accuracy from receiver
- Requires a subscription and connection*
- Optionally use 3rd party app to configure
- Need to understand your map's projection and apply a location profile accordingly



Collector | Using GNSS Metadata

- Stores the raw GNSS measurements from the GPS receiver.
- Useful for performing further data analysis and for performing QA/QC on the field measurements
- Store up to 18 fields of GNSS metadata information (**point features only**)
- Only applies to points created using your GPS location
- 4 of the 18 fields only apply when using Averaging to capture point features
- The fields can be created several ways:

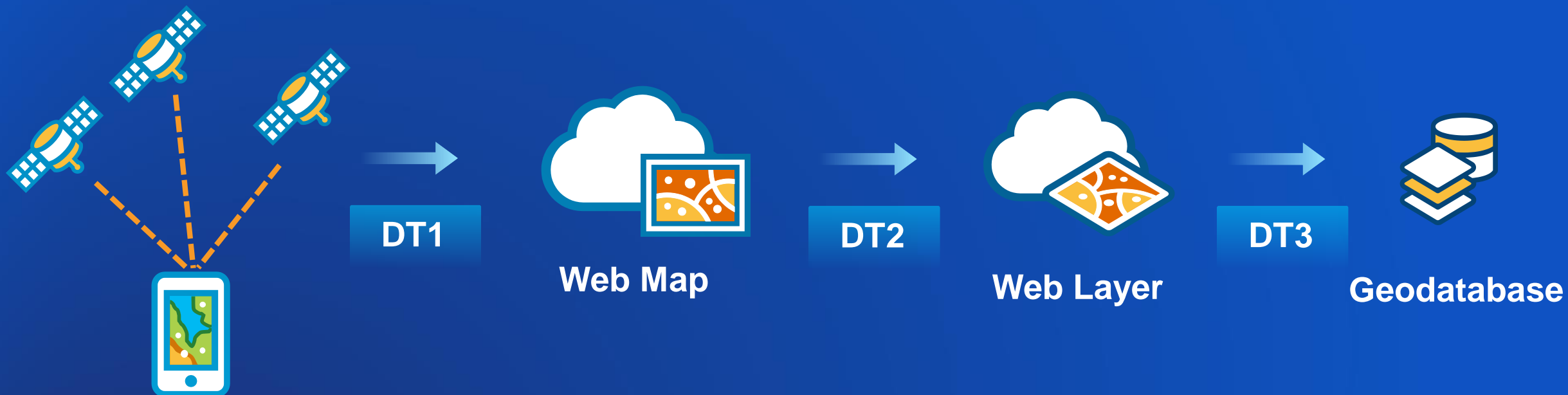
Record metadata fields

- Receiver Name
- Latitude
- Longitude
- Altitude (Height Above Ellipsoid)
- Fix time
- Horizontal Accuracy
- Vertical Accuracy
- PDOP
- HDOP
- VDOP
- Fix Type
- Correction Age
- Station ID
- Number of Satellites
- **Average Horizontal Accuracy***
- **Average Vertical Accuracy***
- **Number of positions averaged***
- **Standard Deviation***

***Only when using Averaging**

Datum Transformations

Minimize when possible to maintain accuracy



DT1 – Defined in location profile

DT2 – Determined by basemap

DT3 – Determined by storage coordinate system

Geographic Transformation Table

Datum Transformations

Spatial Reference Choice for Web Layer

- Null datum transformation for DT2
 - Web Layer same as basemap
- Set datum transformation for DT2
 - Set DT2 during publishing web layer



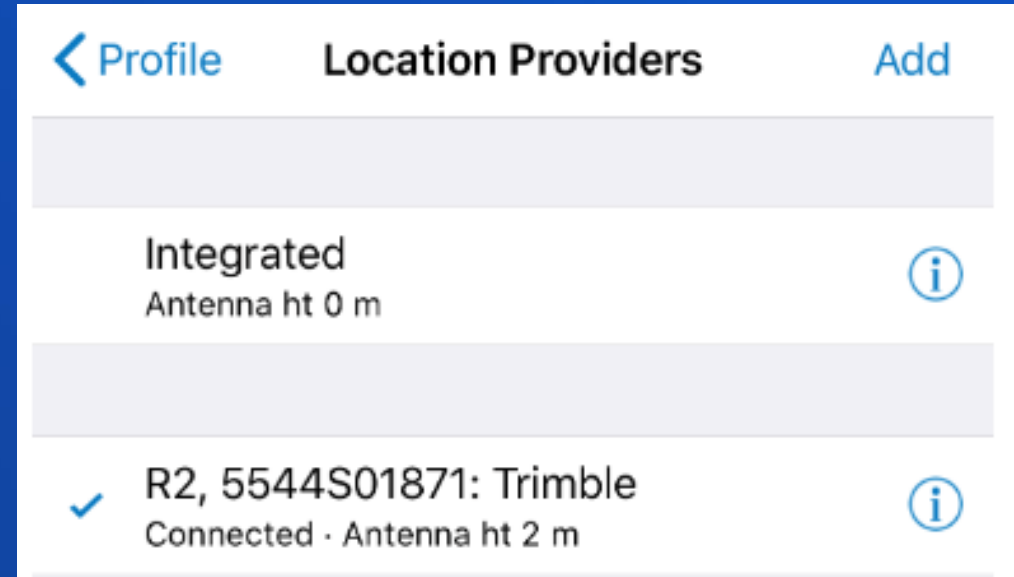
Demo-Collector Setup

New High Accuracy Capabilities



Collector | Location Provider

- Located in App Settings
- Support for
 - Integrated receivers
 - Bluetooth receivers
 - Serial receivers on Windows
- Connect to named receiver
- Specify antenna height

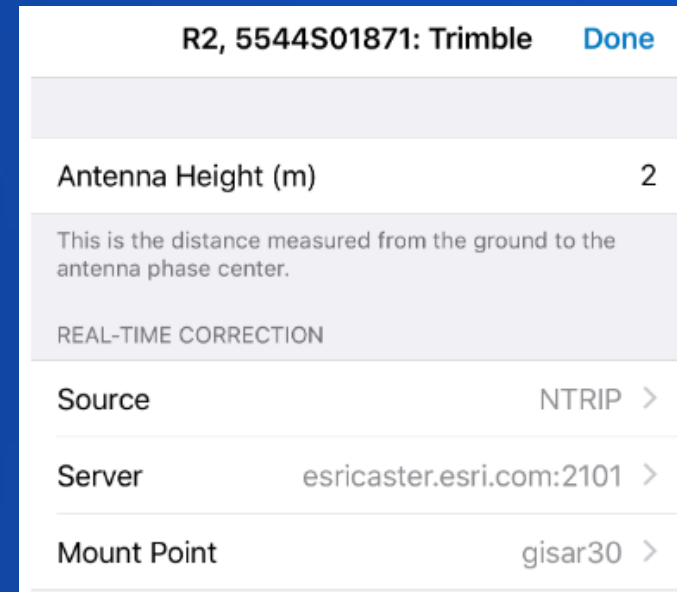
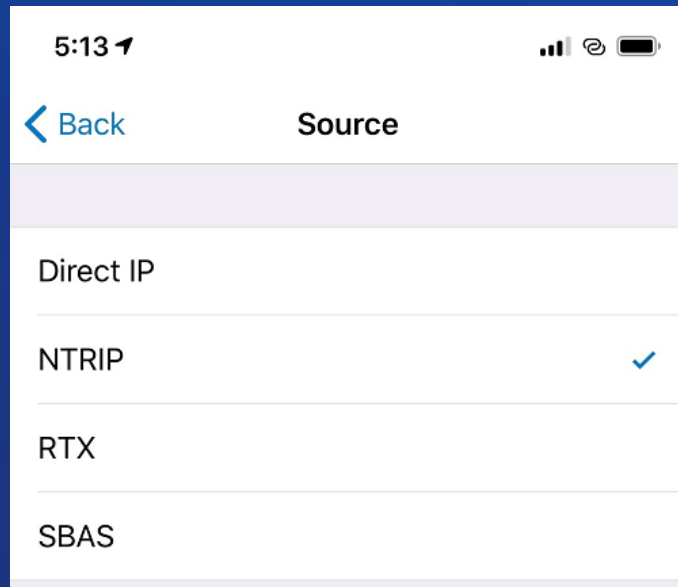


iOS White Listed Providers:

- Trimble R1/R2
- Eos Positioning
- Geneq iSxBlue
- CHC
- Bad-Elf
- Aman NMEA-BT Adapter
- DualGPS
- Garmin GLO
- Leica GG04 Plus*

Collector | Location Provider

- Configure RTK corrections for Trimble receivers directly in Collector (**iOS ONLY**)
- Accessible through the location provider details



Collector | Location Profile

- Define the transformation used from receiver to map
 - Integrated location sensor or external GNSS receiver

Input: Coordinate System used by GNSS receiver correction service

- Always GCS (example: NAD_1983_2011)

Output: Coordinate System used by Web Map's BaseMap

- GCS or PCS

Method: Datum transformation selection

- Choices by map extent
- Grid-based transformations are supported (Custom transformations not supported)

Name: Provide a memorable name for the profile

RTK Done

GNSS COORDINATE SYSTEM

GCS NAD 1983 2011
6318

MAP COORDINATE SYSTEM

WGS 1984 Web Mercator Auxiliary Sphere
3857

DATUM TRANSFORMATION

~WGS_1984_(ITRF08)_To_NAD_1983_2011
58
USA - CONUS and Alaska; PRVI

1:05

< Back Datum Transformation Done

Search

ETRS_1989_To_OSGB_1936_OSTN15
UK - Britain and UKCS 49~46°N to 61~01°N, 7~33°W to 3~33°E

ETRS_1989_To_WGS_1984 + WGS_1984_To_OSGB_1936_OSTN15
Europe - ETRS89 + UK - Britain and UKCS 49~46°N to 61~01°N, 7~33°W to 3~33°E

~OSGB_1936_To_ETRS_1989_1
UK - Great Britain; Isle of Man

ETRS_1989_To_WGS_1984 + ~OSGB_1936_To_WGS_1984_7
Europe - ETRS89 + UK - Great Britain; Isle of Man

ETRS_1989_To_WGS_1984 + ~OSGB_1936_To_WGS_1984_Petroleum
Europe - ETRS89 + UK - Great Britain; Isle of Man

ETRS_1989_To_WGS_1984 + ~OSGB_1936_To_WGS_1984_1
Europe - ETRS89 + UK - Great Britain; Isle of Man

ETRS_1989_To_WGS_1984 + ~OSGB_1936_To_WGS_1984_NGA_7PAR
Europe - ETRS89 + UK - Great Britain; Isle of Man

ETRS_1989_To_WGS_1984 + ~OSGB_1936_To_WGS_1984_2
Europe - ETRS89 + UK - England

Collector | Location Accuracy and 95% CI

- User-defined accuracy value
 - Match project accuracy requirements
- Specify in imperial or metric units
 - Based on measurement units
- 95% Confidence Interval
 - Required for some organizations
 - Horizontal and vertical accuracies are reported at higher confidence interval
 - Default accuracy reporting uses RMS, which is around 68% confidence interval

3:45

< Profile Accuracy

Distance (inches) 10

Set required location accuracy for data collection.

Inches ✓

Feet

95% Confidence ☐

Report horizontal and vertical accuracy at a higher confidence level.

Field Data Collection

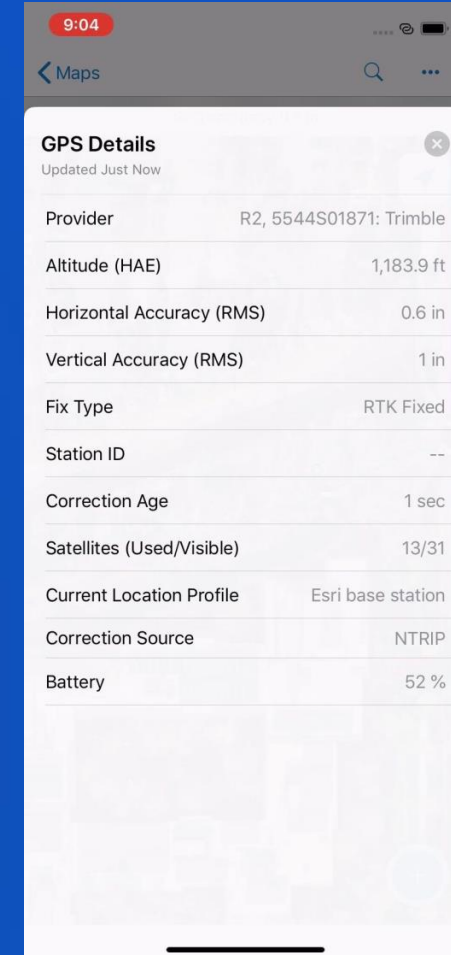
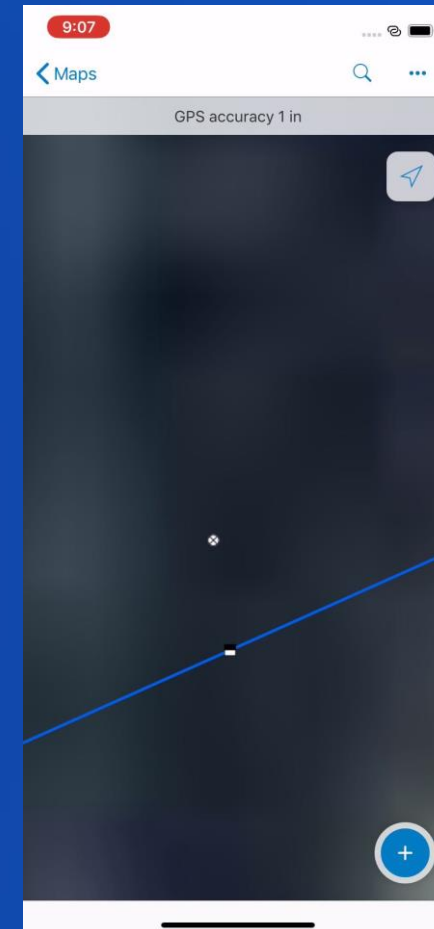
New High Accuracy Capabilities and Use Cases





Demo Recap

- GPS Details
 - Useful for troubleshooting
- Basemap overzoom
 - Zoom in beyond minimum scale range (resampled)
- GPS Metadata fields
 - Auto-populate accuracy information to point features
 - Based on well-known fields added to your Feature Layer (points only)



Collector | Averaging

[< Profile](#) **GPS Averaging**

GPS Averaging

☒

Points to Average

10

Set the number of points you would like to average.
Minimum number of points is 2.

9:11

Cancel Collect Submit

Averaging 13 of 25 · GPS accuracy 0.9 in

Gate: 0
34.058017°N 117.196690°W

Stop Averaging

Take Photo

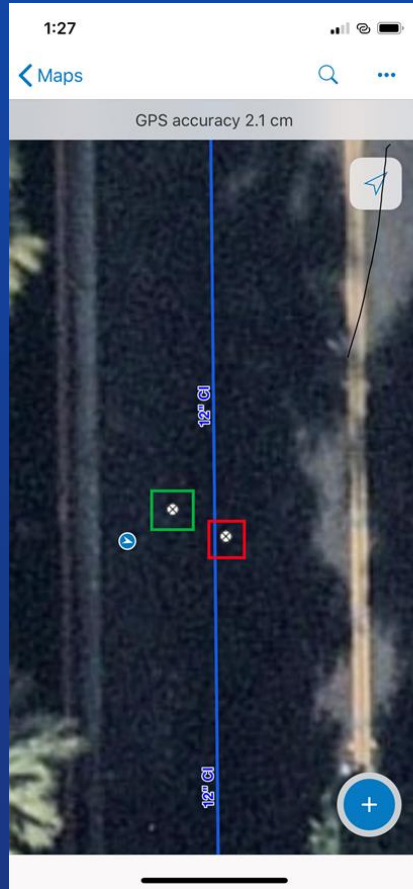
Attach

OUTLET_SIZE *
0

AS_BUILT *
Active >

INSPECTION_DATE *
6/24/2019, 5:44 PM

Collector | Incorrect Location Profile



Capture Features Using Offsets



Offsets – getting started

- **Hardware**

- Eos GNSS receiver
- Laser rangefinder
 - TruPulse 200x
- Angle encoder (optional)
- Tripod, bipod, or range pole (recommended)

- **Software**

- Collector for ArcGIS (iOS)
- Eos Tools Pro

- **Three Methods**

- Method 1 – Standard Laser Offset
- Method 2 – Range-Backsight Offset
- Method 3 – Range-Range Offset



Offset Method 2: Range-Backsight Offset

- **Equipment**

- GNSS receiver
- Laser range finder
- Angle Encoder

- **Steps**

1. Capture GNSS backsight point
2. Capture GNSS control point
3. From control point fire at backsight point
4. Fire the target



Demo - Collect locations using GPS offsets

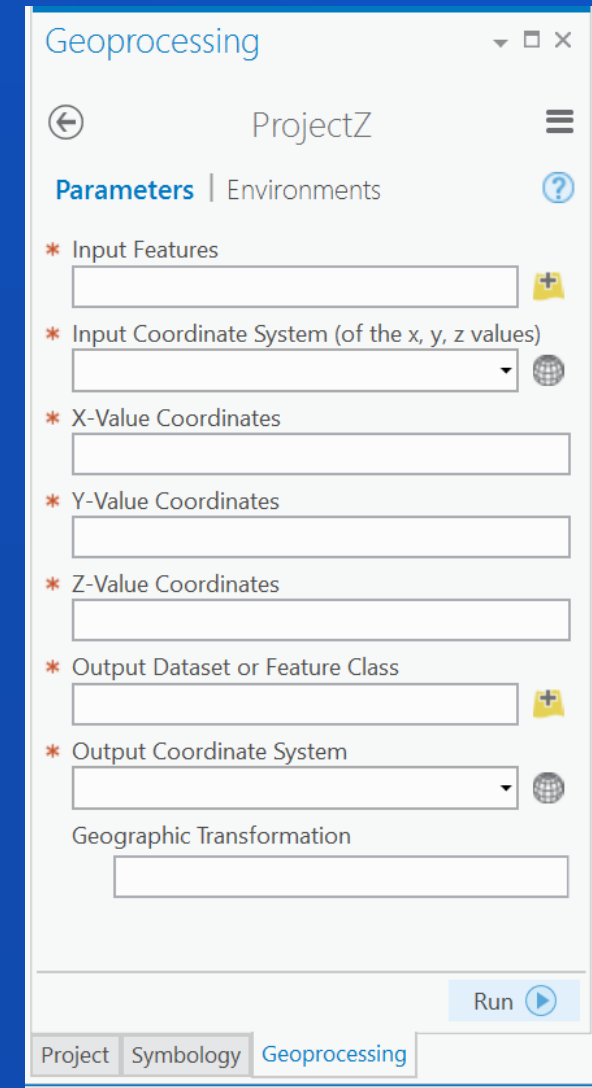


Additional Tools



Collector | ProjectZ Geoprocessing Tool

- Custom geoprocessing tool for ArcGIS Pro
- Built on top of existing Project tool
- Converts Latitude/Longitude/Altitude metadata values to a new z-enabled feature class
- Supports vertical datum transformations to obtain orthometric heights
- Requires the ArcGIS Coordinate Systems Data for ArcGIS Pro
- Maintains existing attachments for output feature class
- Download ArcGIS Pro toolbox from public [GitHub](#) repo



The screenshot shows the 'ProjectZ' geoprocessing tool window in ArcGIS Pro. The window has a title bar 'Geoprocessing' and a toolbar with a back arrow, the tool name 'ProjectZ', and a menu icon. Below the toolbar are tabs for 'Parameters' (selected) and 'Environments', along with a help icon. The 'Parameters' section lists several required inputs, each marked with a red asterisk: 'Input Features' (text box with a plus icon), 'Input Coordinate System (of the x, y, z values)' (dropdown menu with a globe icon), 'X-Value Coordinates' (text box), 'Y-Value Coordinates' (text box), 'Z-Value Coordinates' (text box), 'Output Dataset or Feature Class' (text box with a plus icon), and 'Output Coordinate System' (dropdown menu with a globe icon). Below these is a 'Geographic Transformation' text box. At the bottom right is a 'Run' button with a play icon. At the very bottom are three tabs: 'Project', 'Symbology', and 'Geoprocessing' (which is active).

Other Resources

Technical workshops

- Coordinate Systems in ArcGIS – 7/11
- Deep Dive into Transformations – 7/11
- Integrating Laser Measurement Solutions with ArcGIS Mobile Apps – 7/11

Other resources

- *Lining Up Data in ArcGIS: A Guide to Map Projections, Second Edition*





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