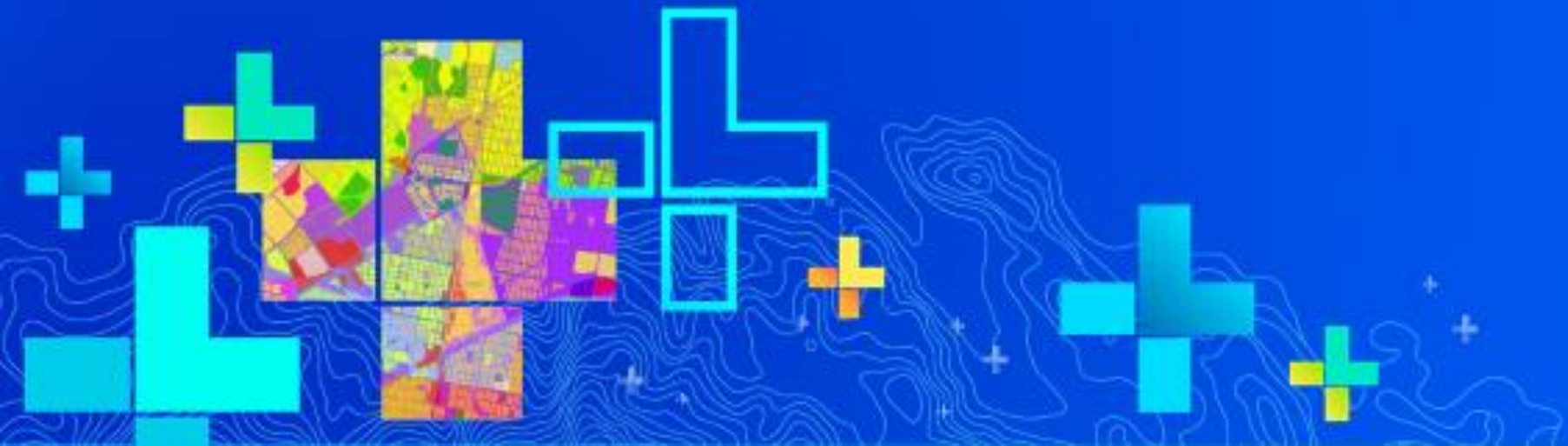
Collector for ArcGIS: Working with High Accuracy Data

Kevin Burke

Colin Lawrence



Agenda

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

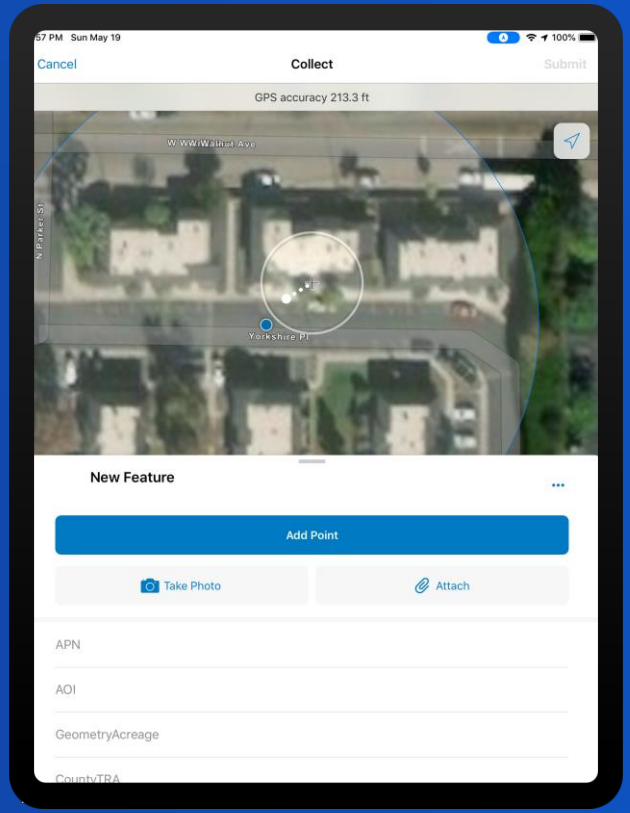
Collector for ArcGIS

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



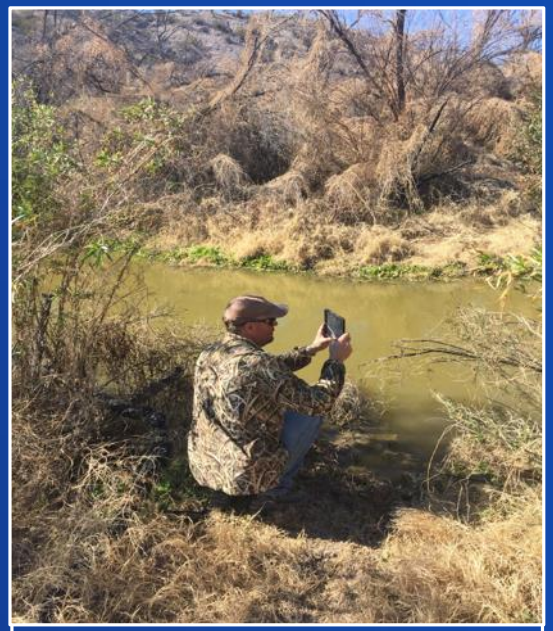
Get it from Microsoft

Download on the App Store

GET IT ON Google Play

Collector| How is it being used?

Collect and Maintain Asset Data

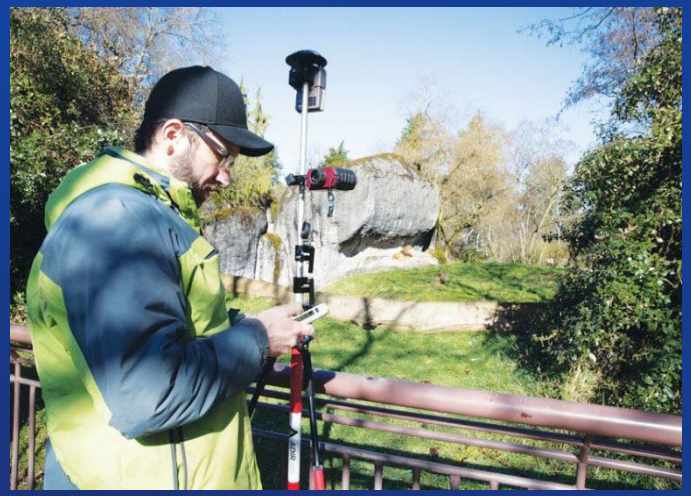


Capture Observations

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

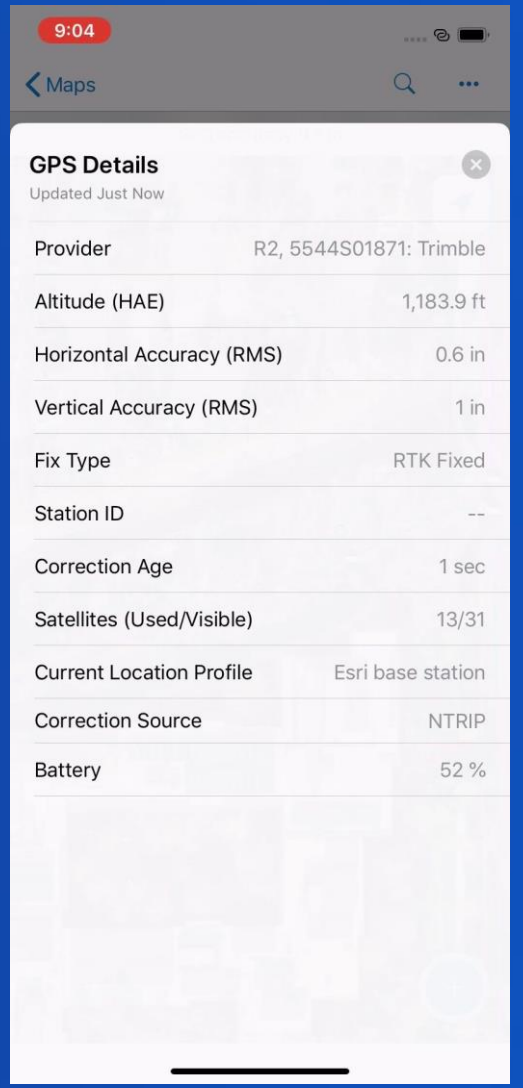
Data Collection Considerations

- 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:

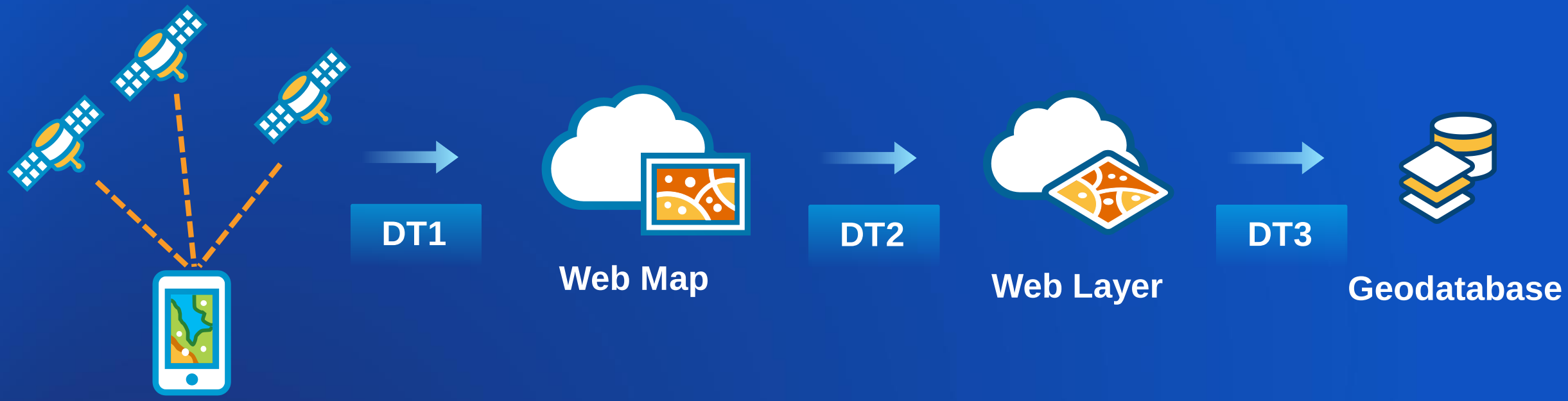
  Record metadata fields

- 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**

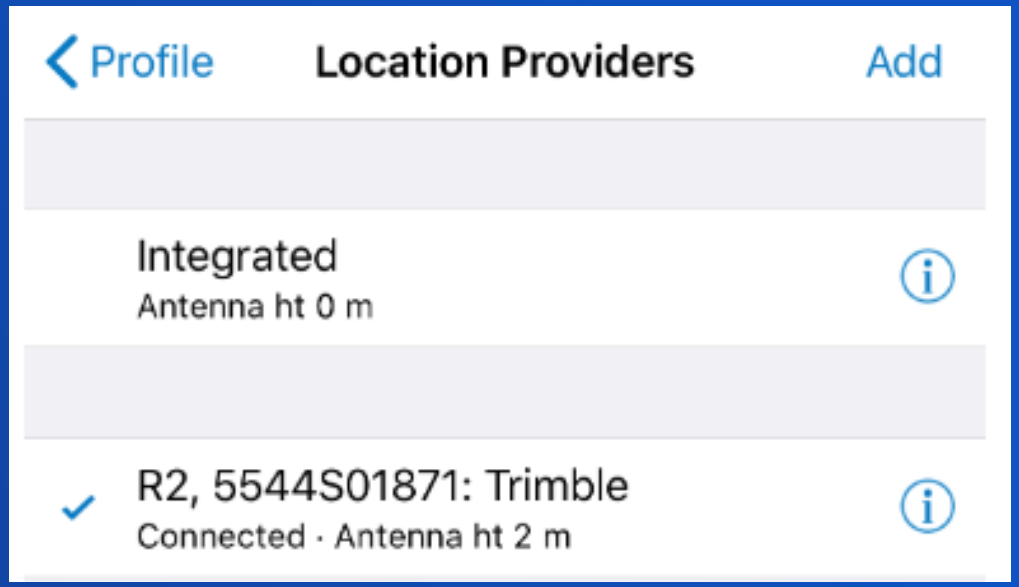
- **Set datum transformation for DT2**
  - **Set DT2 during publishing web layer**

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

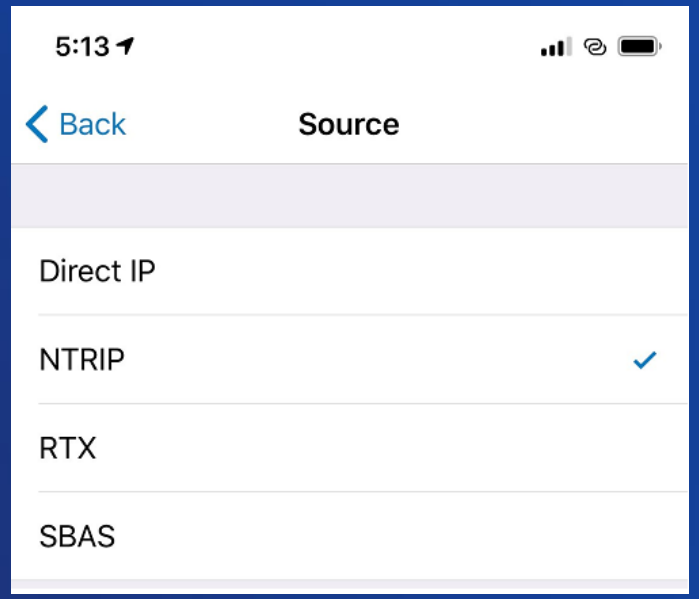


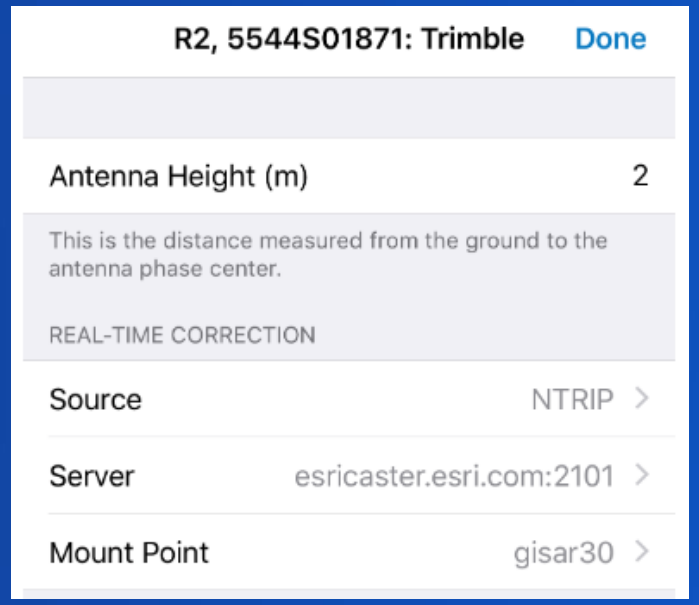
iOS White Listed Providers:

- 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)

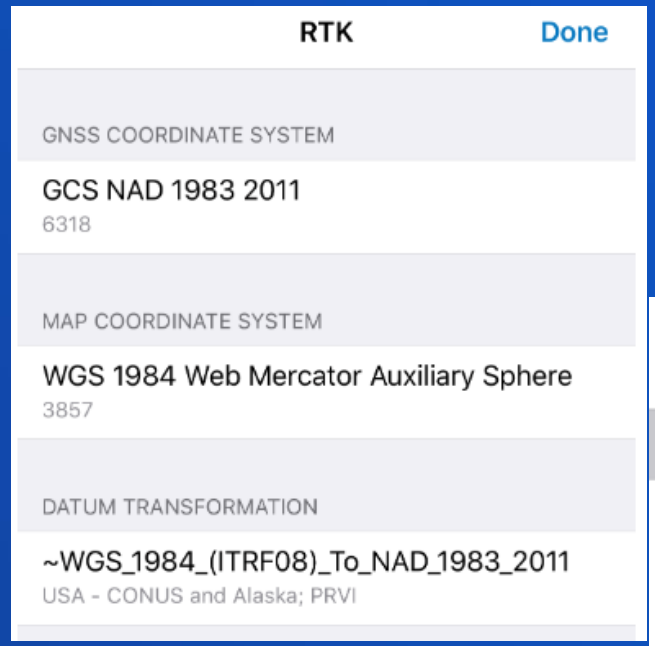
Output: Coordinate System used by Web Map's BaseMap

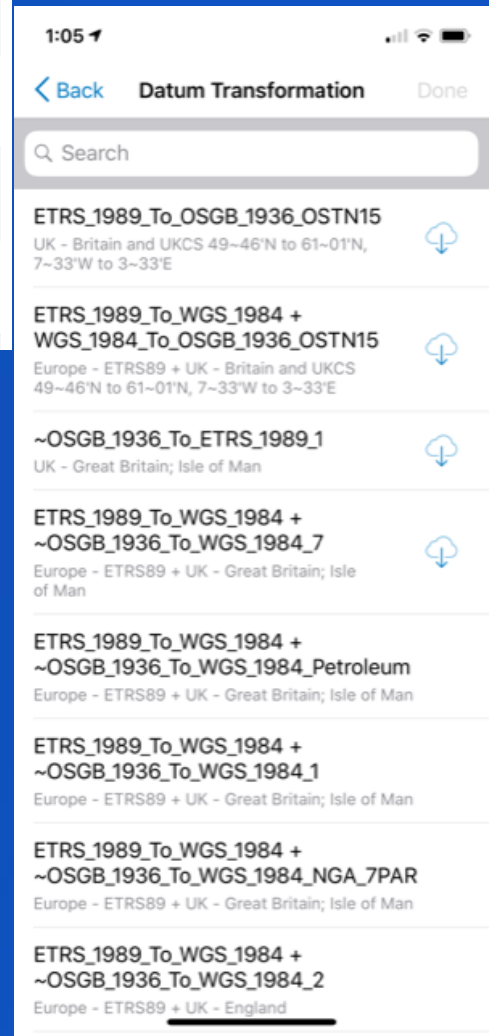
  - GCS or PCS

Method: Datum transformation selection

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

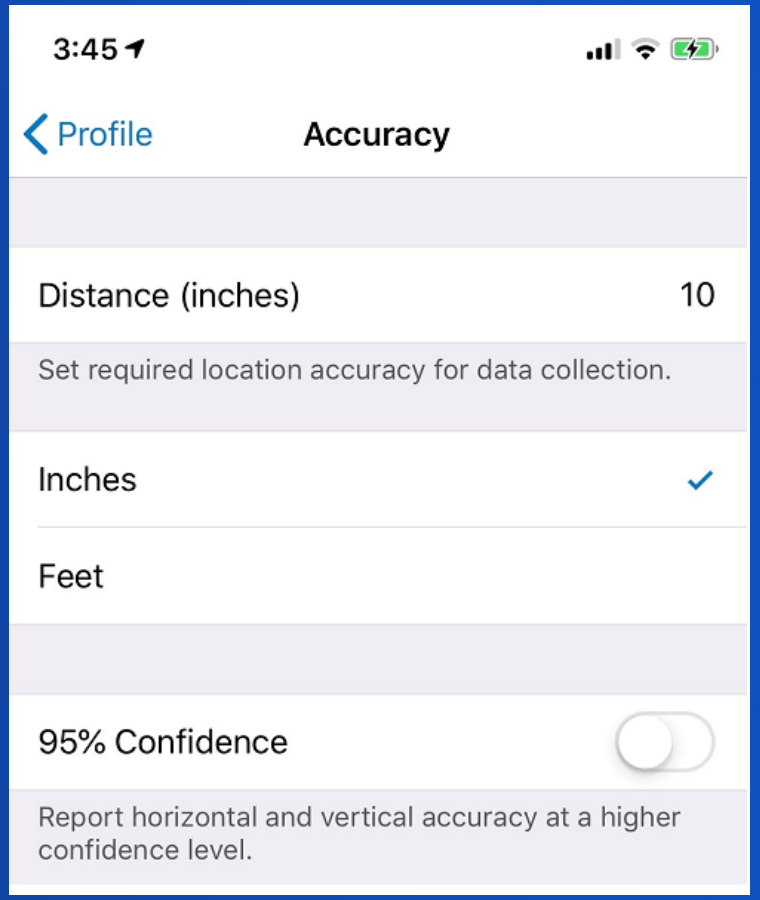
Name: Provide a memorable name for the profile





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

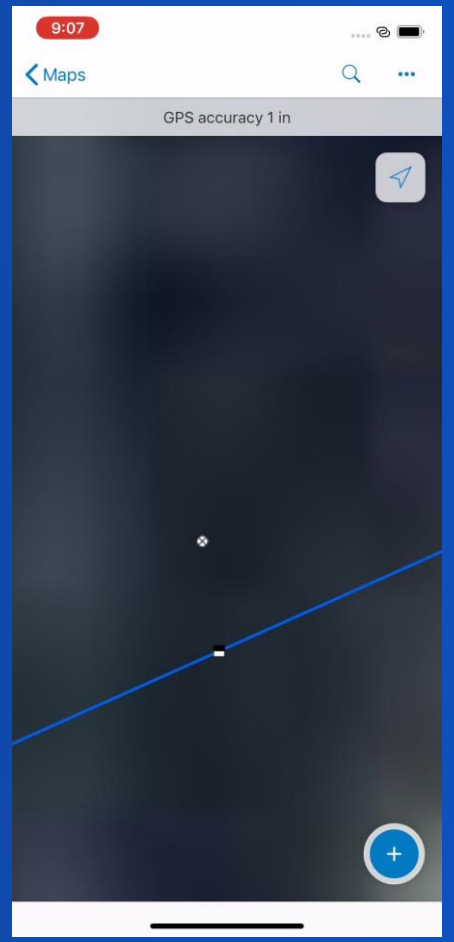


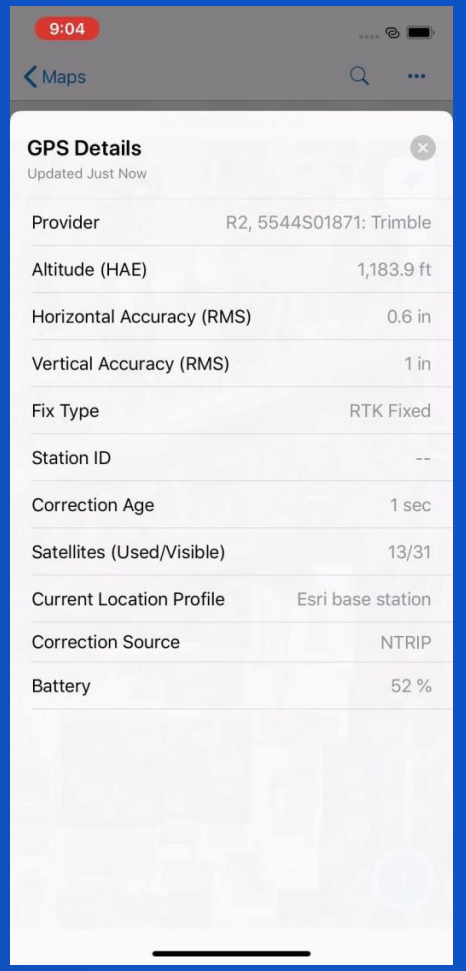
Field Data Collection

New High Accuracy Capabilities and Use Cases

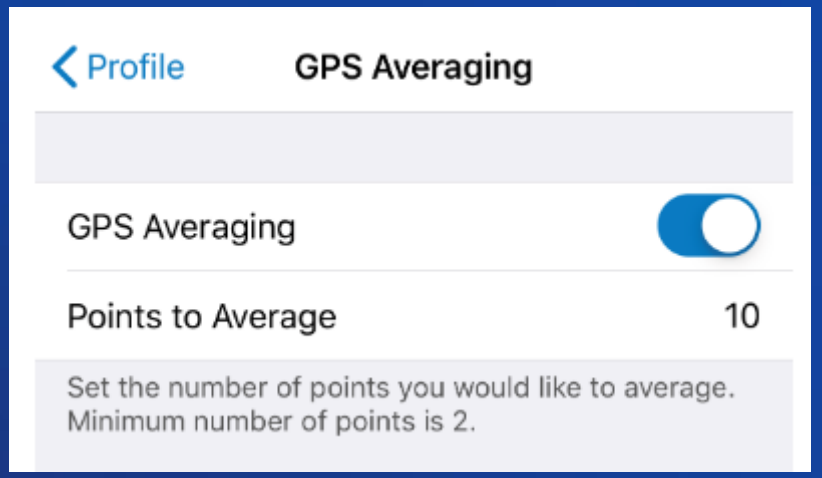
Demo Recap

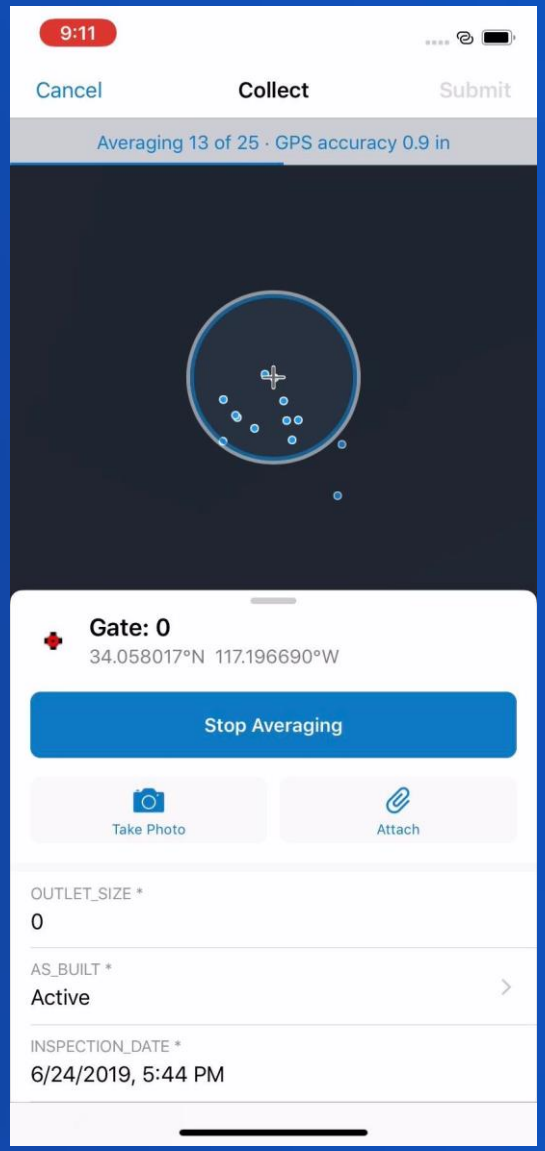
- GPS Details
  - Useful for troubleshooting
- Basemap overzoom
  - Zoom in beyond minimum scale range (resampled)
- GPS Metadata fields
  - Auto-populate accuracy information to point features
  - Based on well-known fields added to your Feature Layer (points only)



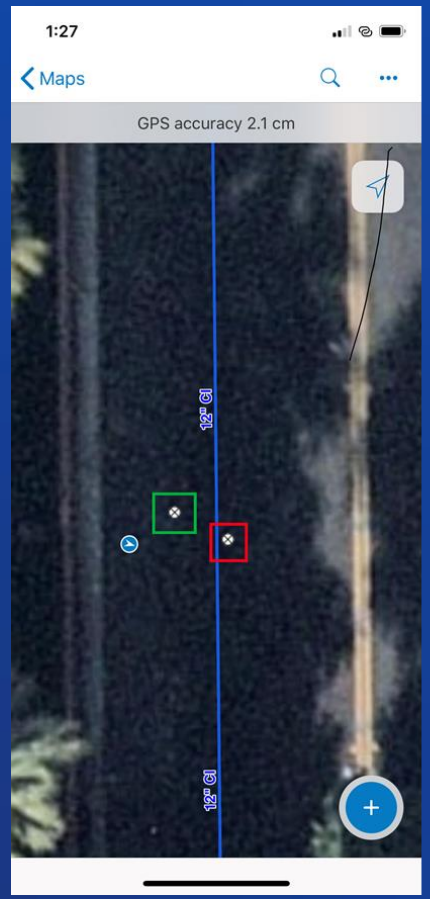


Collector | Averaging





Collector | Incorrect Location Profile



Capture Features Using Offsets

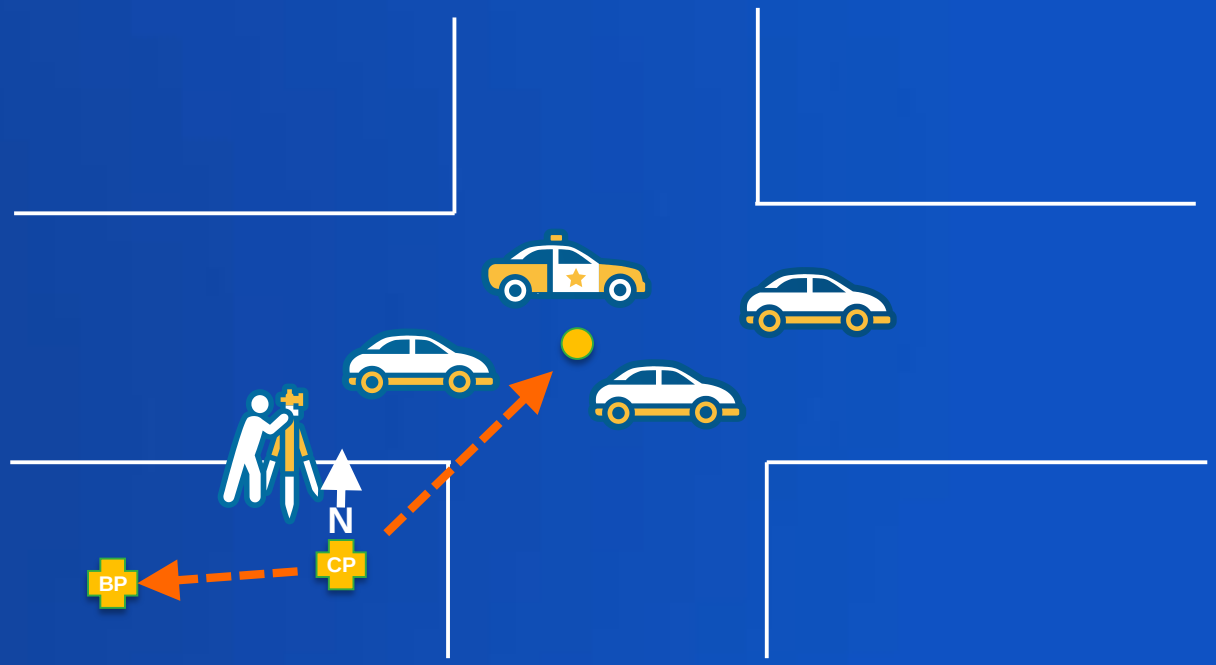
Offsets – getting started

- 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

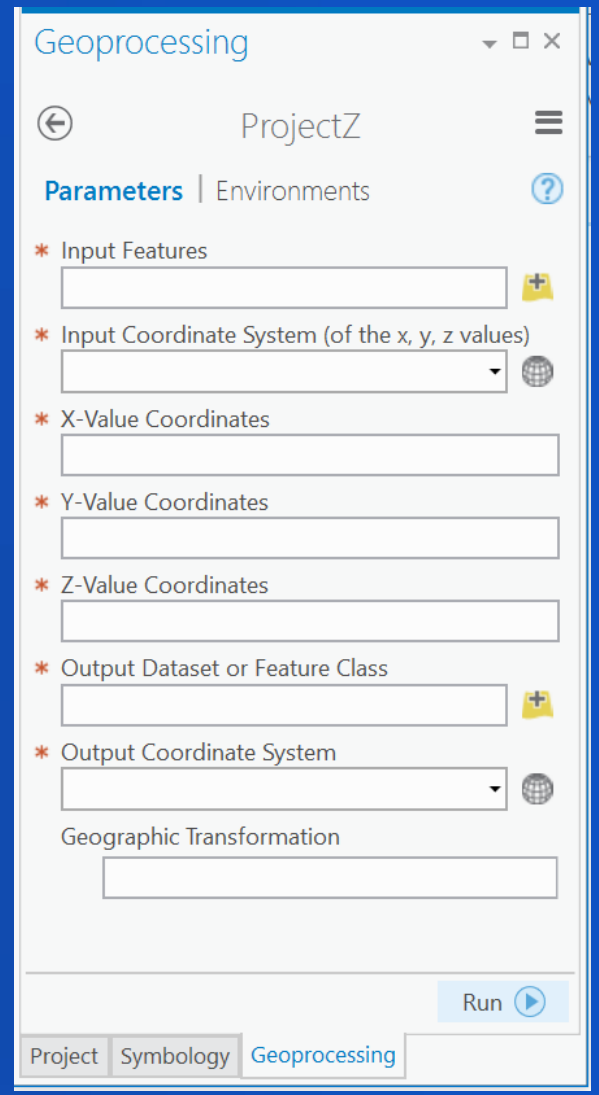


Demo - Collect locations using GPS offsets

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



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**


esri
THE
SCIENCE
OF
WHERE