




ArcGIS Apps for the Field: An Introduction

Kade Beem Solution Engineer, Science-Civilian
Kate Hess Solution Engineer, International

2021 ESRI FEDERAL GIS CONFERENCE

Introduction	ArcGIS Field Maps	ArcGIS QuickCapture	ArcGIS Survey123	Conclusion
Field Operations Modernization	Overview Mobile & Web Demo 	Overview What's New Demo 	Overview What's New Demo 	Resources Questions

Introduction

Field Operations

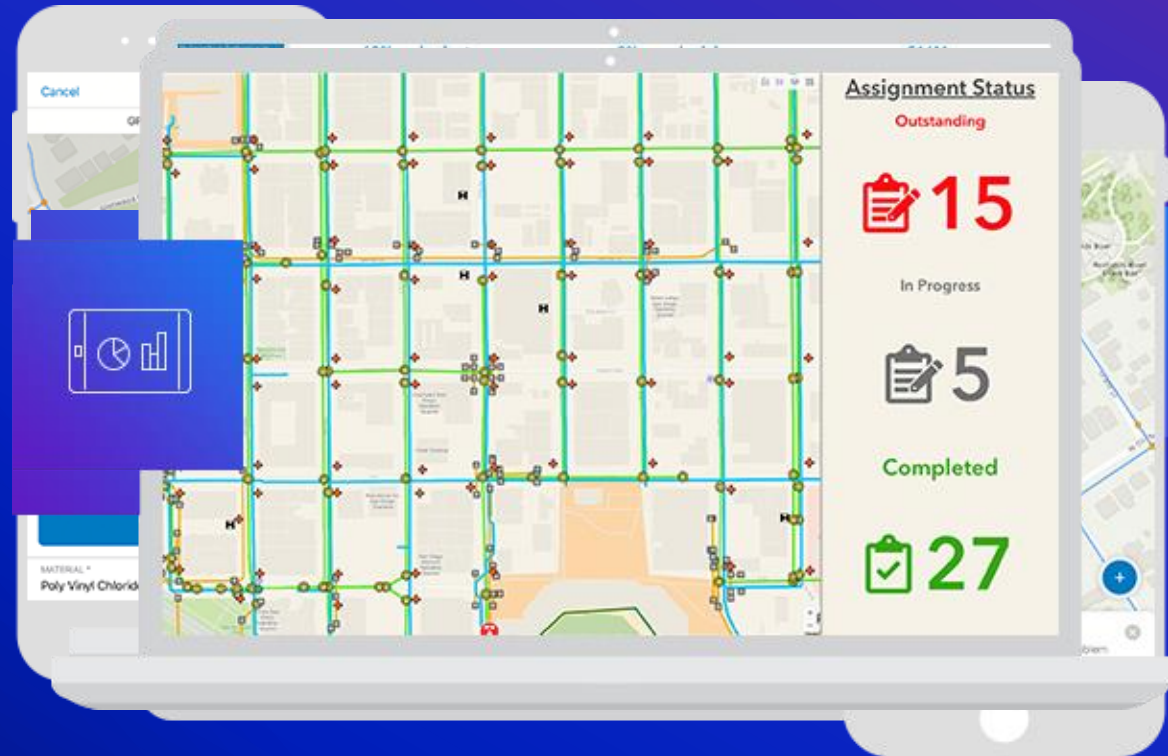


Field Operations | Benefits of modernization



Field Operations | Benefits of modernization

- Efficient and accurate data capture
- Cost effective
- Data management
- Monitor status



Field Operations

Location-enable all phases of field work



Focused Apps

- ArcGIS Workforce
- ArcGIS Explorer
- ArcGIS Navigator
- ArcGIS Collector
- ArcGIS Tracker
- ArcGIS Survey123
- ArcGIS QuickCapture



ArcGIS Field Maps | The all-in-one app for fieldwork



Best in breed **mapping** system



World class **data collection** solution



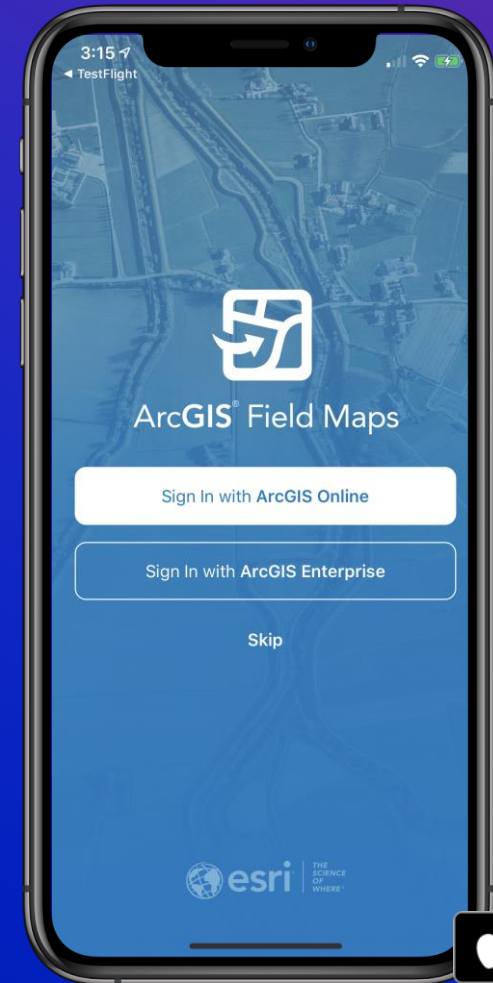
Revolutionary location **tracking** technology



World class **tasking** and work management*



State of the art **navigation** capabilities*



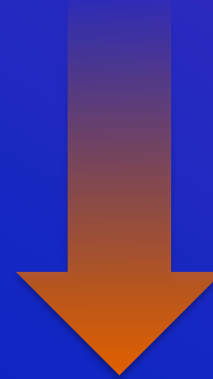
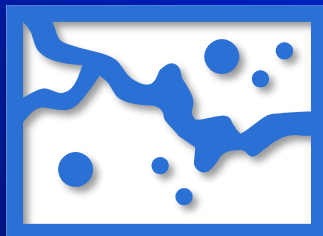
*Capabilities will be included in future releases



Field Operations | Which app do I choose?



Field Operations | Which app do I choose?



ArcGIS Field Maps

All-in one app for fieldwork

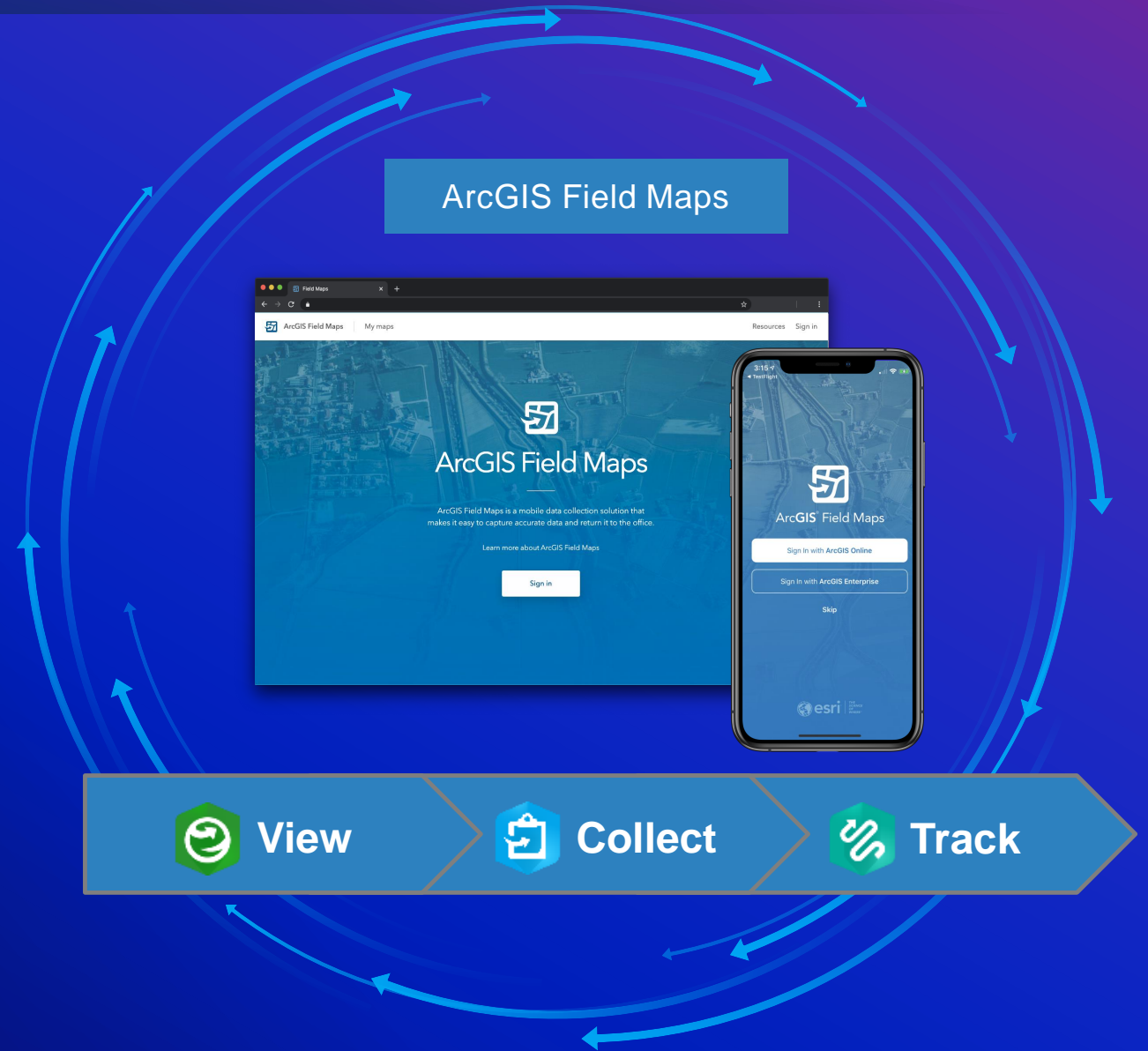






ArcGIS Field Maps | 5 key capabilities in one app

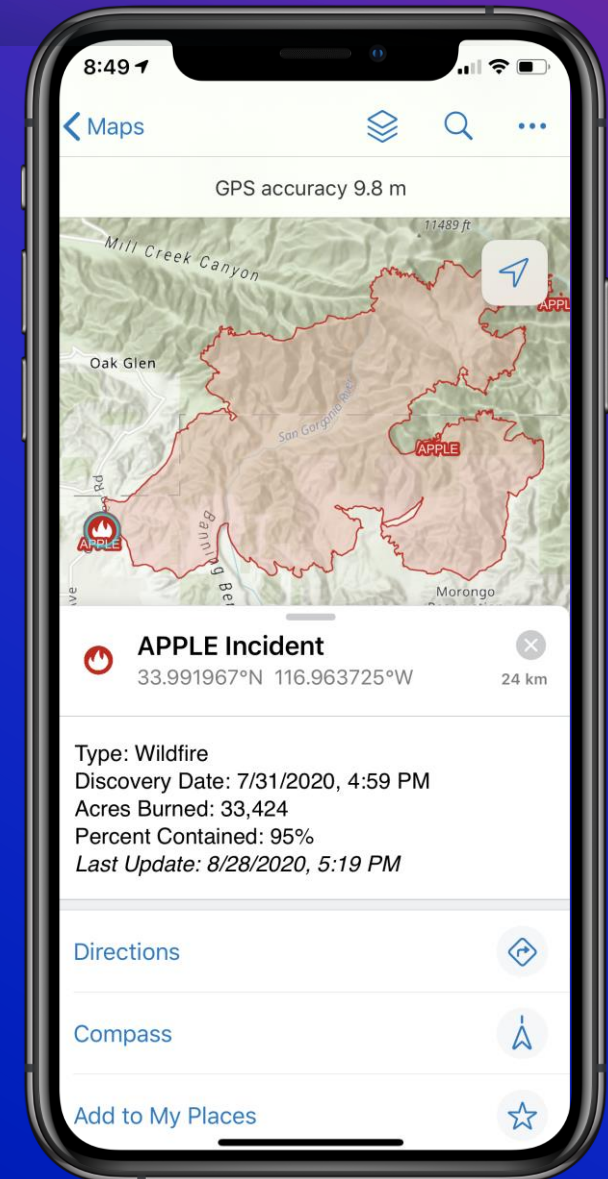
1. Map Viewing
2. Map Markup
3. Data Collection
4. Asset Inspection
5. Location Tracking





Map Support

- Advanced symbology/labeling (w/ Arcade)
- Group layers, annotation
- Pop-ups (w/ Arcade including feature sets)
- Layer refresh for auto-updates

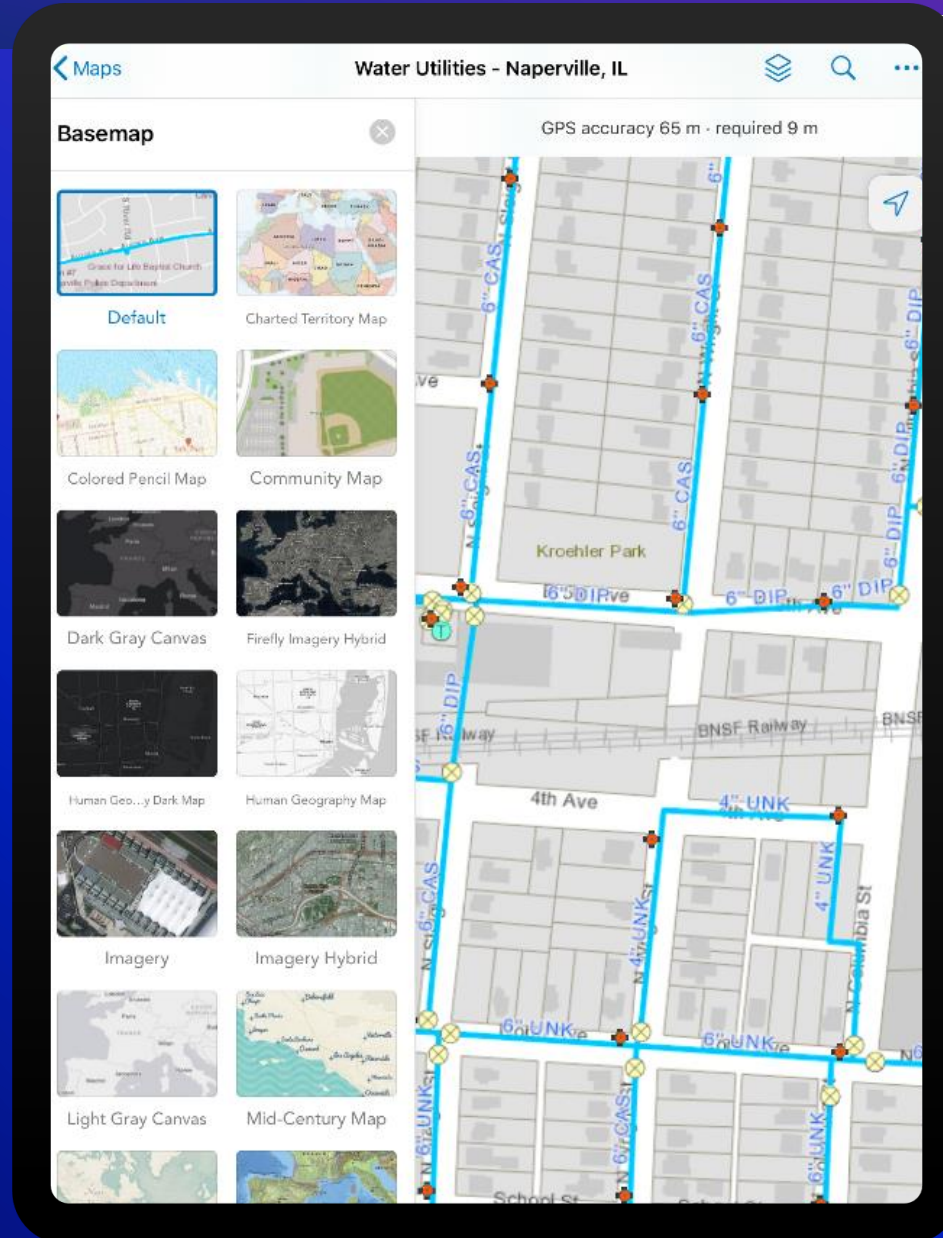




ArcGIS Field Maps | Map Viewing capabilities

Map Tools

- Basemaps

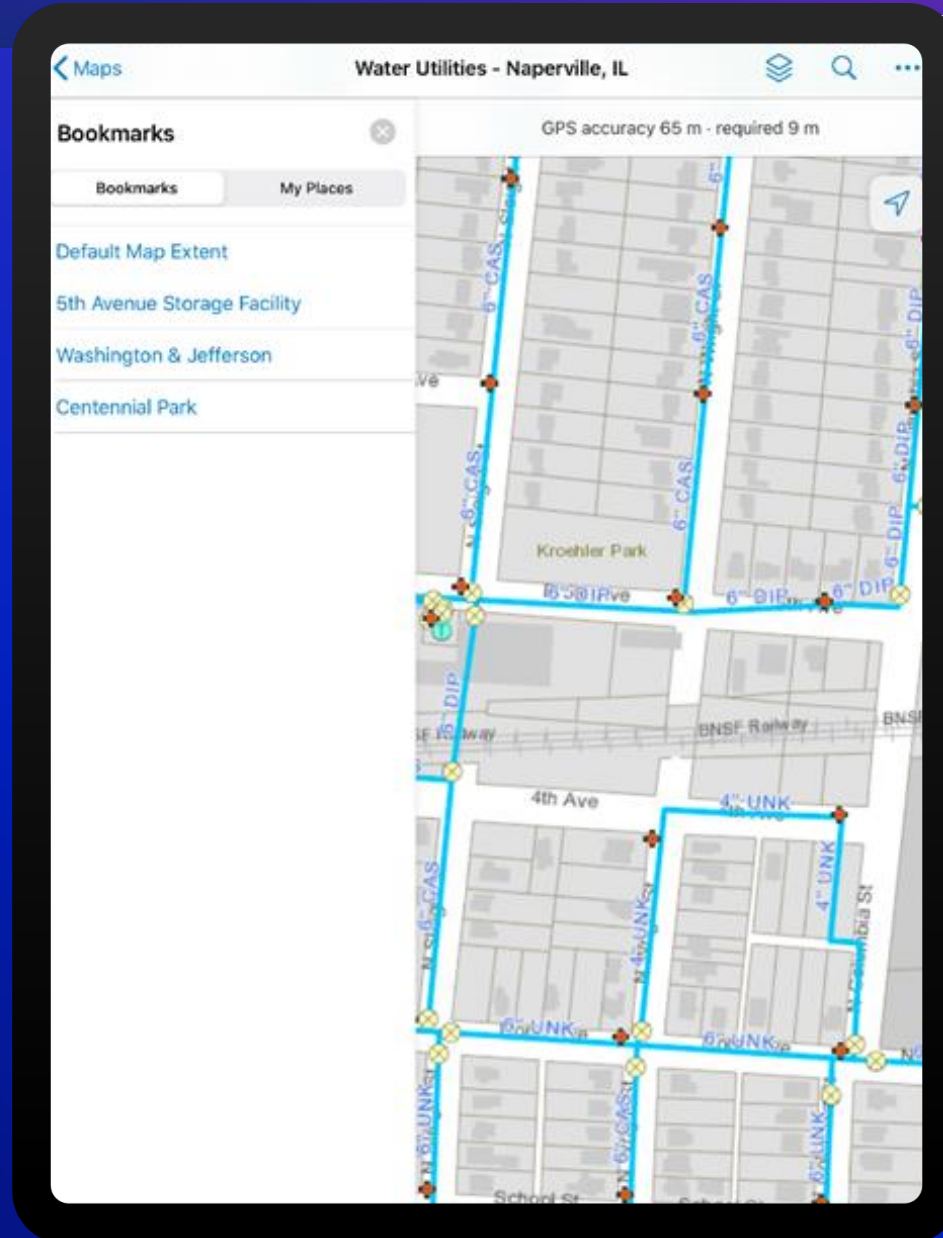




ArcGIS Field Maps | Map Viewing capabilities

Map Tools

- Basemaps
- Bookmarks

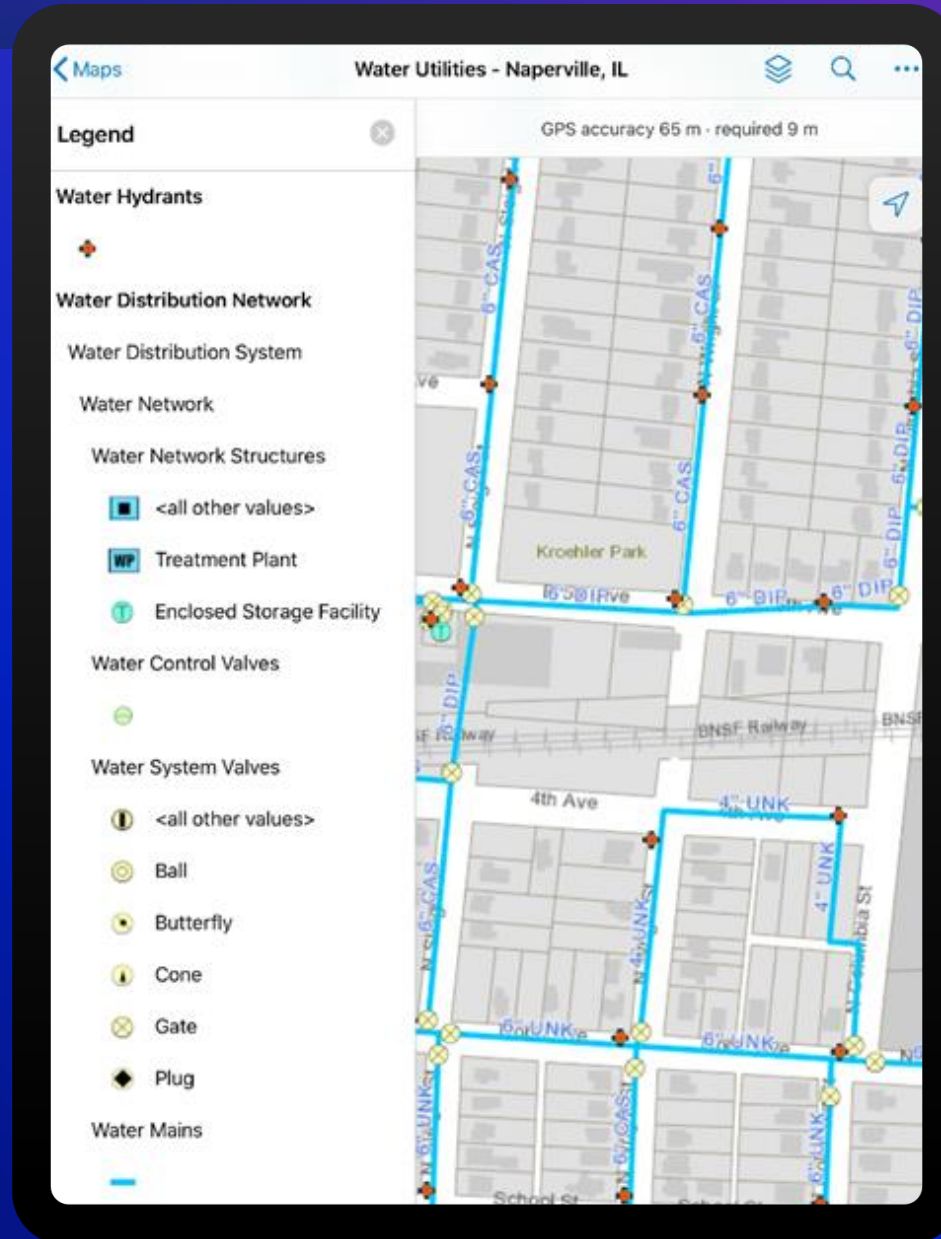




ArcGIS Field Maps | Map Viewing capabilities

Map Tools

- Basemaps
- Bookmarks
- Legend

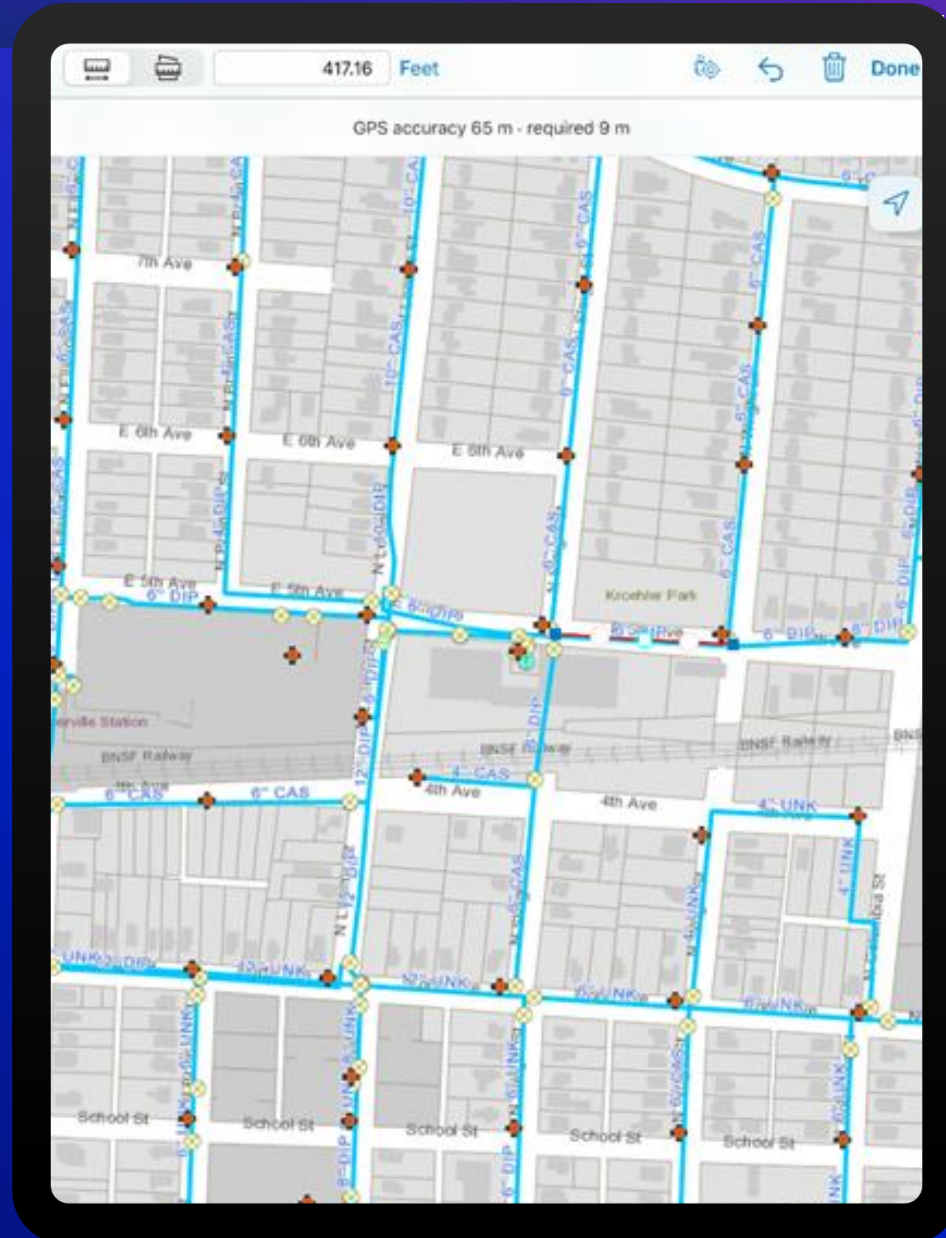




ArcGIS Field Maps | Map Viewing capabilities

Map Tools

- Basemaps
- Bookmarks
- Legend
- Measure (lines, areas)

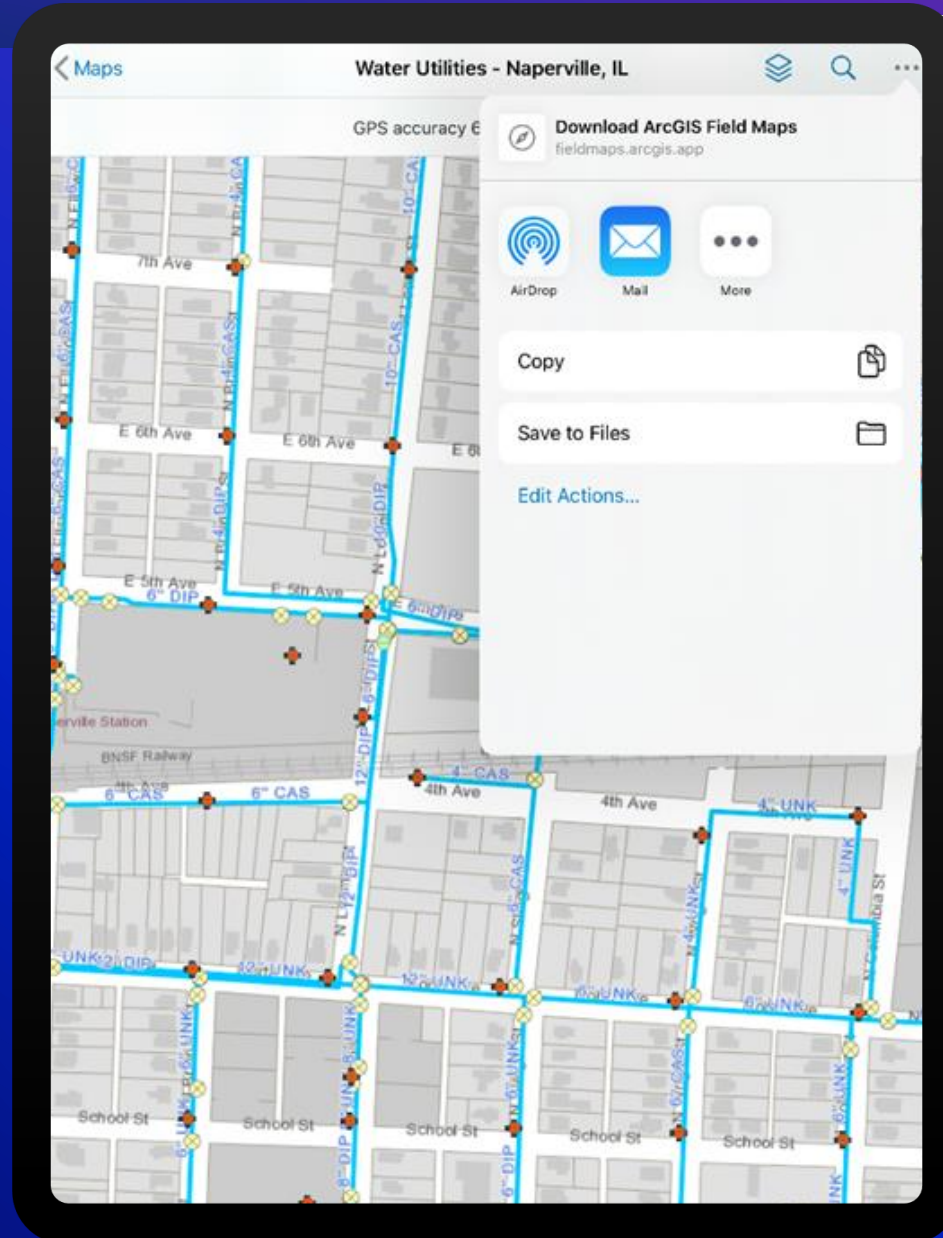




ArcGIS Field Maps | Map Viewing capabilities

Map Tools

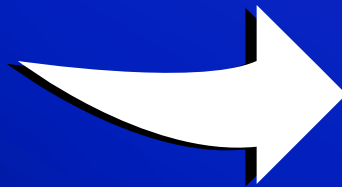
- Basemaps
- Bookmarks
- Legend
- Measure (lines, areas)
- Share Map





Map Tools

- Basemaps
- Bookmarks
- Legend
- Measure (lines, areas)
- Share Map
- Search
- Sync
- Directions
- Compass





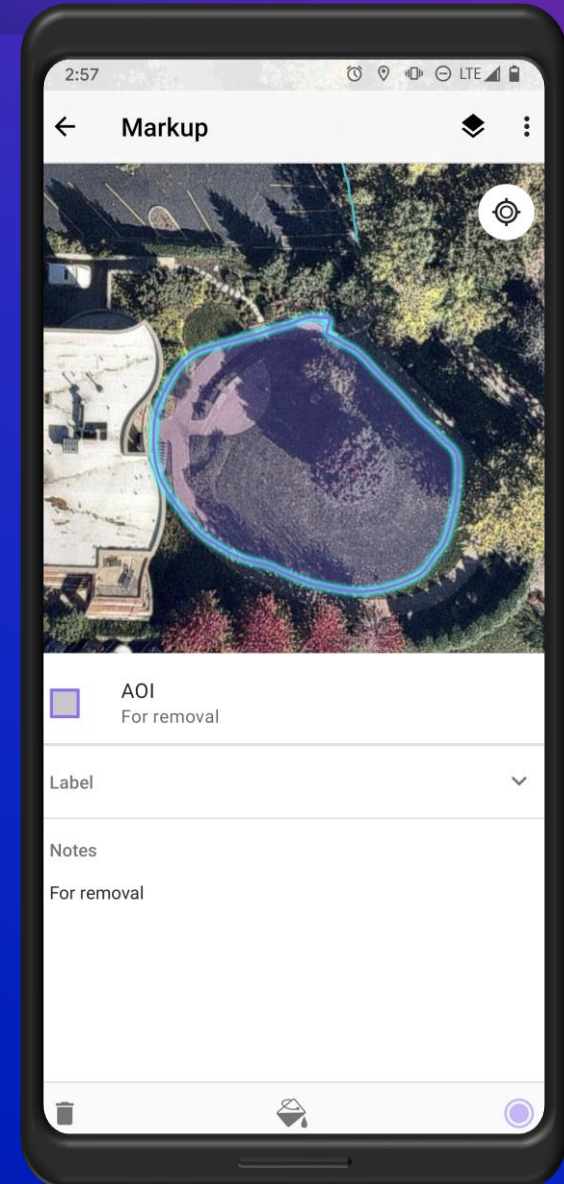
ArcGIS Field Maps | Map markup capabilities

Markup Tool

Markup Layers

Share Markup

- Place a marker
- Freehand sketch lines and areas
- Recognize shapes
- Move graphics





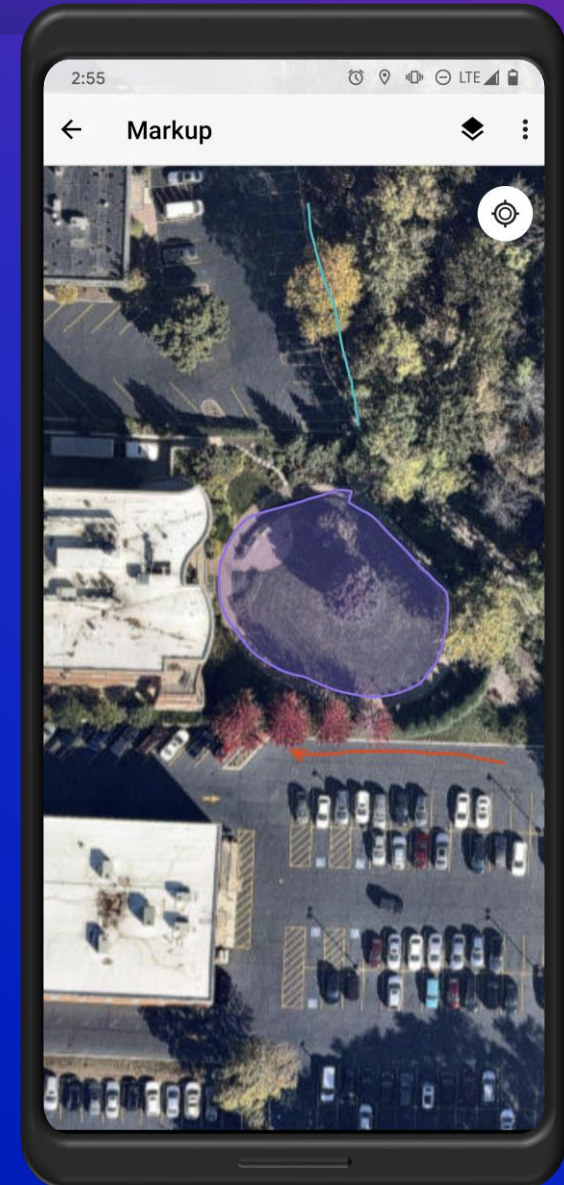
ArcGIS Field Maps | Map markup capabilities

Markup Tool

Markup Layers

Share Markup

- Markers, lines, arrows, areas
 - Choose color
 - Label and note attributes
- Save markup in one or more layers
- Turn markup layers on/off with Layers tool





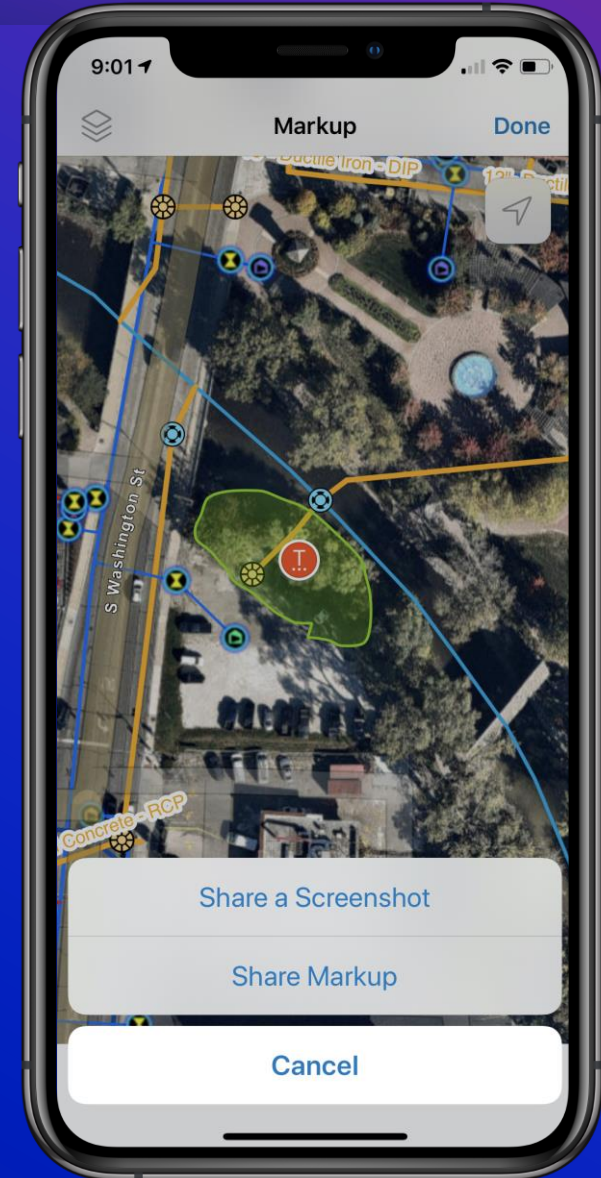
ArcGIS Field Maps | Map markup capabilities

Markup Tool

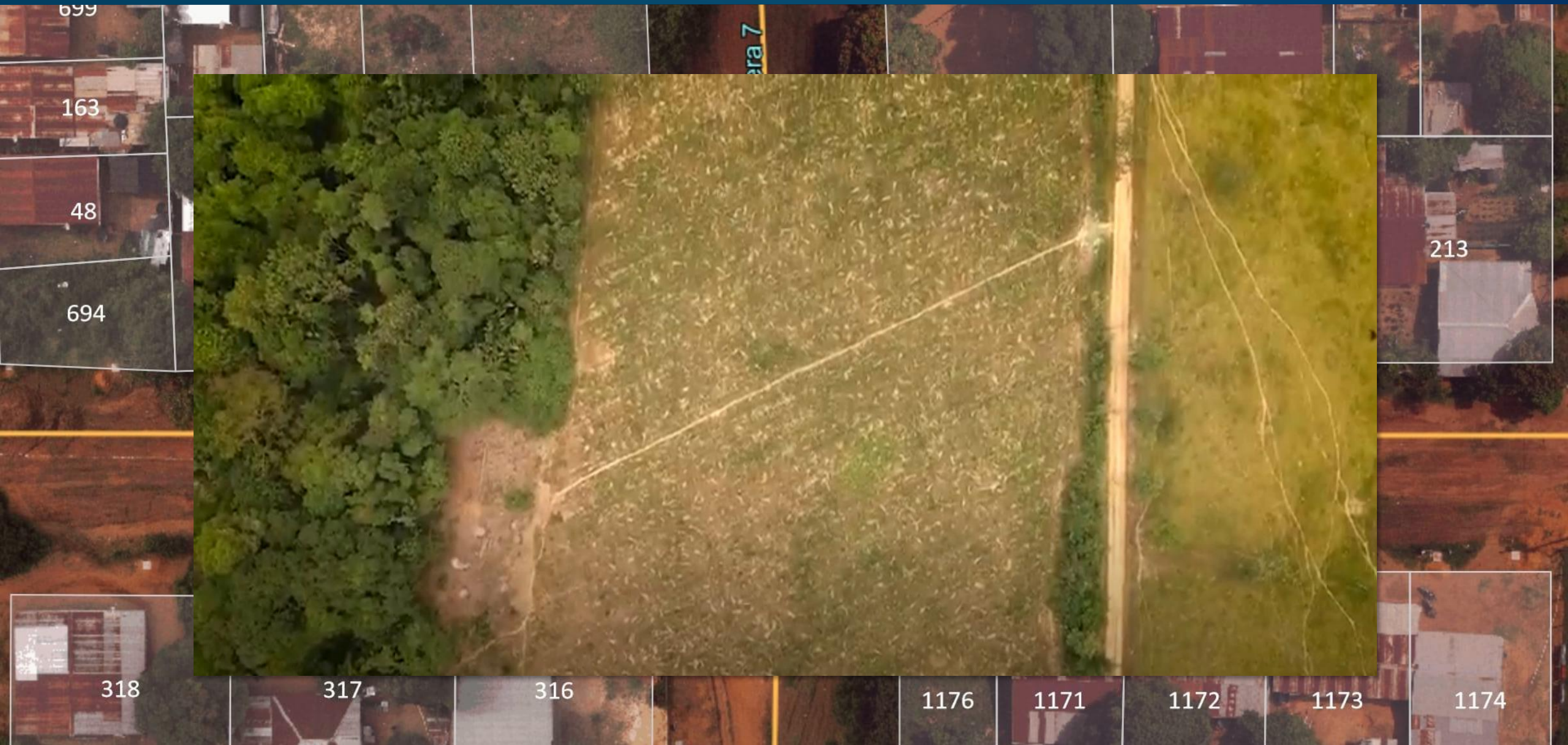
Markup Layers

Share Markup

- OTA, by email, text message
- ArcGIS organization
 - Requires publishing privileges









ArcGIS Field Maps | Data Collection – High Accuracy GPS/GNSS

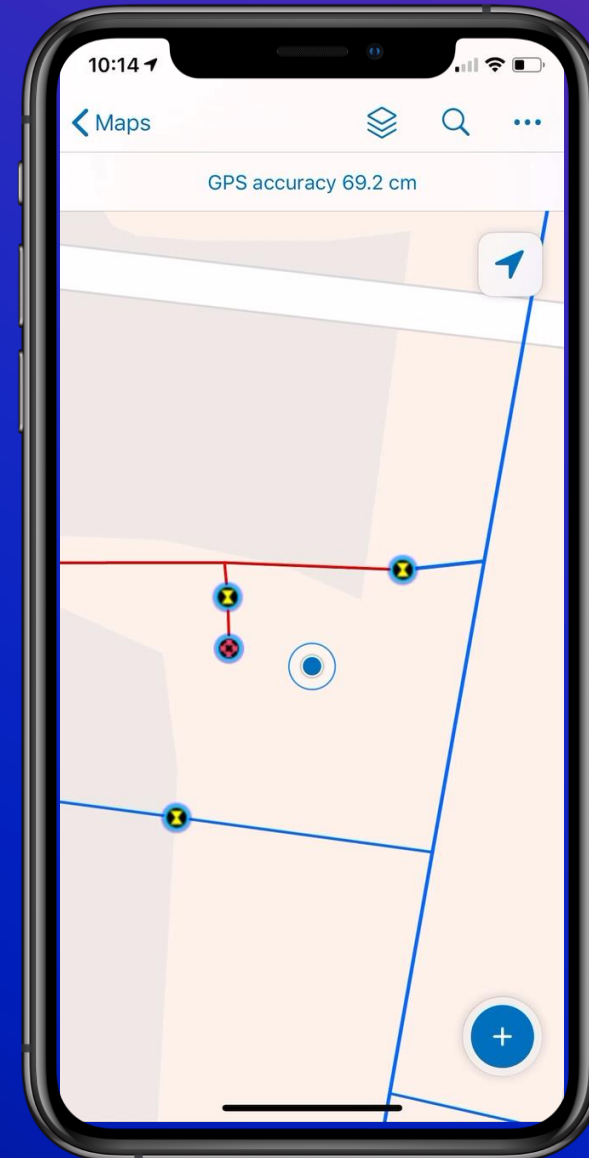
- **Need better GPS accuracy**
 - 1 – 3 meters for above ground assets
 - > 1 foot for below ground assets
 - Cm accuracy for construction projects
- **Key GNSS Partners**
 - Dual, Garmin
 - Eos Positioning Systems, Geneq, Bad Elf
 - Juniper, Trimble, Leica
- **Different ergonomic solutions**
 - Pole mount
 - Backpack
 - 3D-printed attachments and more





ArcGIS Field Maps | Asset Inspection & Smart Forms

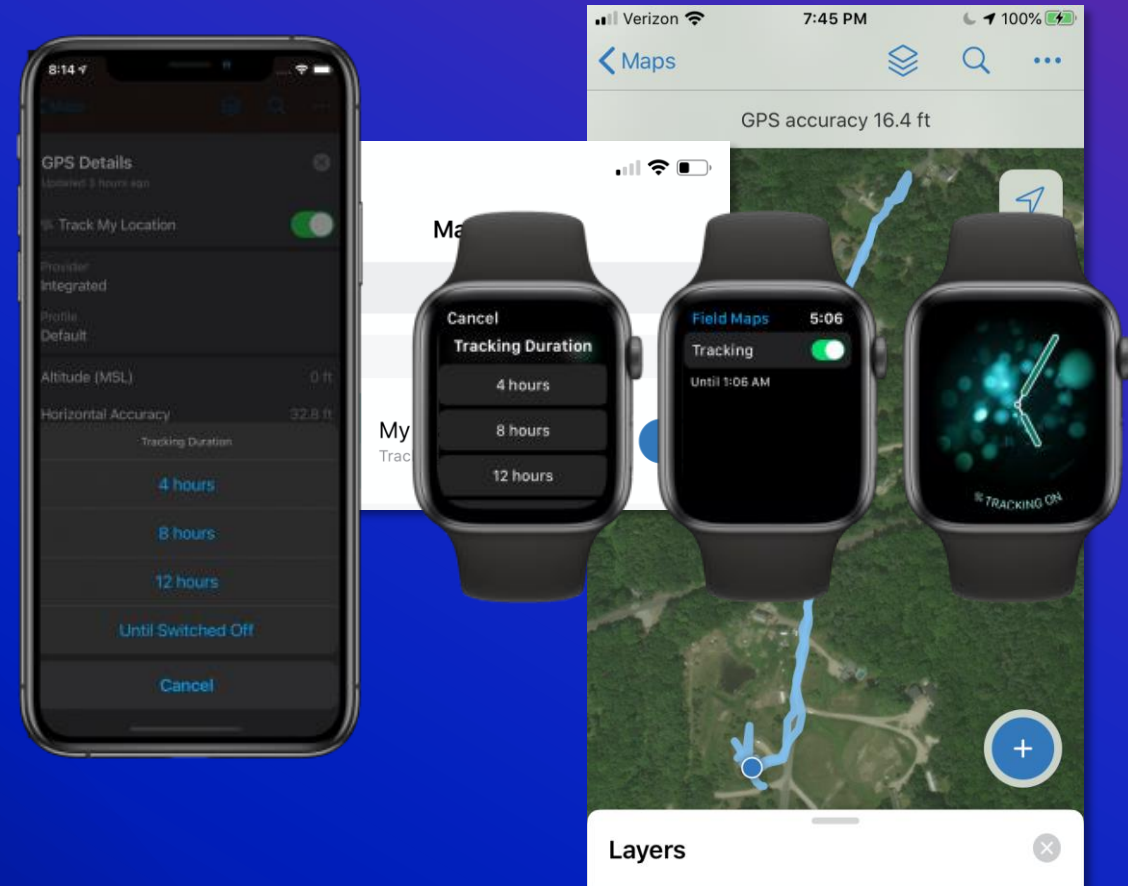
- Transaction model support
 - Non-versioned
 - Traditional versioning
 - Offline Branch versioning (10.8.1+)
- Historical inspections
 - Model using 1:M relationships
- Smart forms capability
 - Organize attributes
 - Conditional visibility
 - Pick lists
 - Required fields





ArcGIS Field Maps | Location Tracking

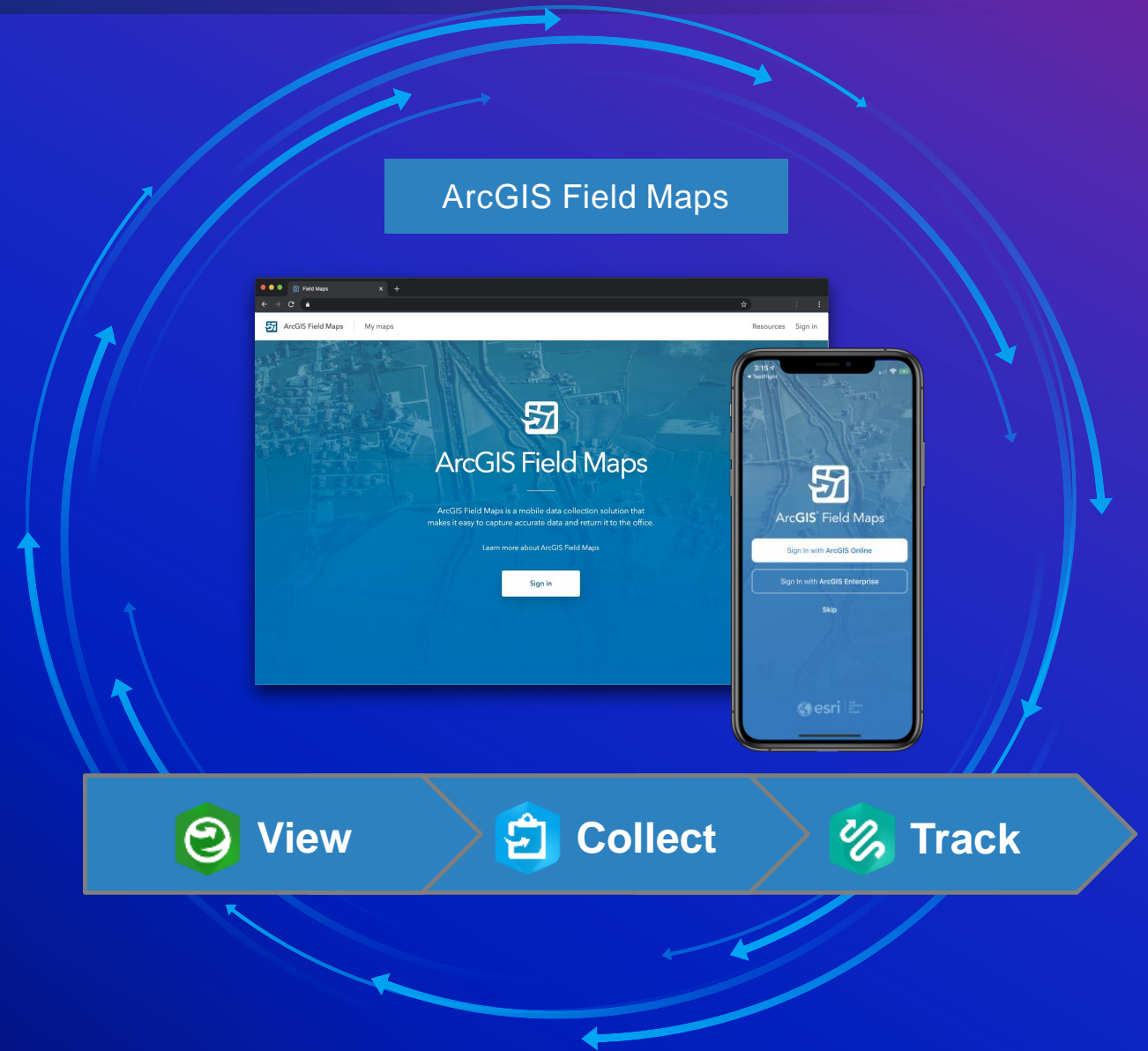
- Supports Viewer user type + ArcGIS Tracker license
- **Battery savings** location tracking capability
 - Driven by activity
- Switch **tracking on/off**
- **View location tracks** in any map (iOS/Android)
 - Turn tracks layer on/off
 - Set track duration
- Supported on Apple Watch

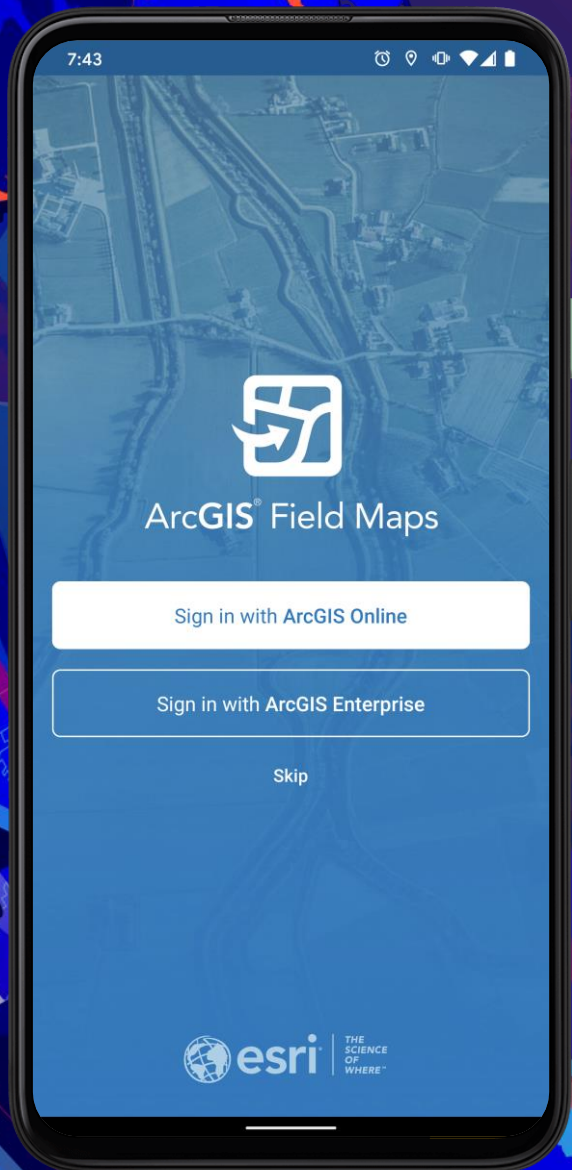




ArcGIS Field Maps | 5 key capabilities in one app

1. Map Viewing
2. Map Markup
3. Data Collection
4. Asset Inspection
5. Location Tracking





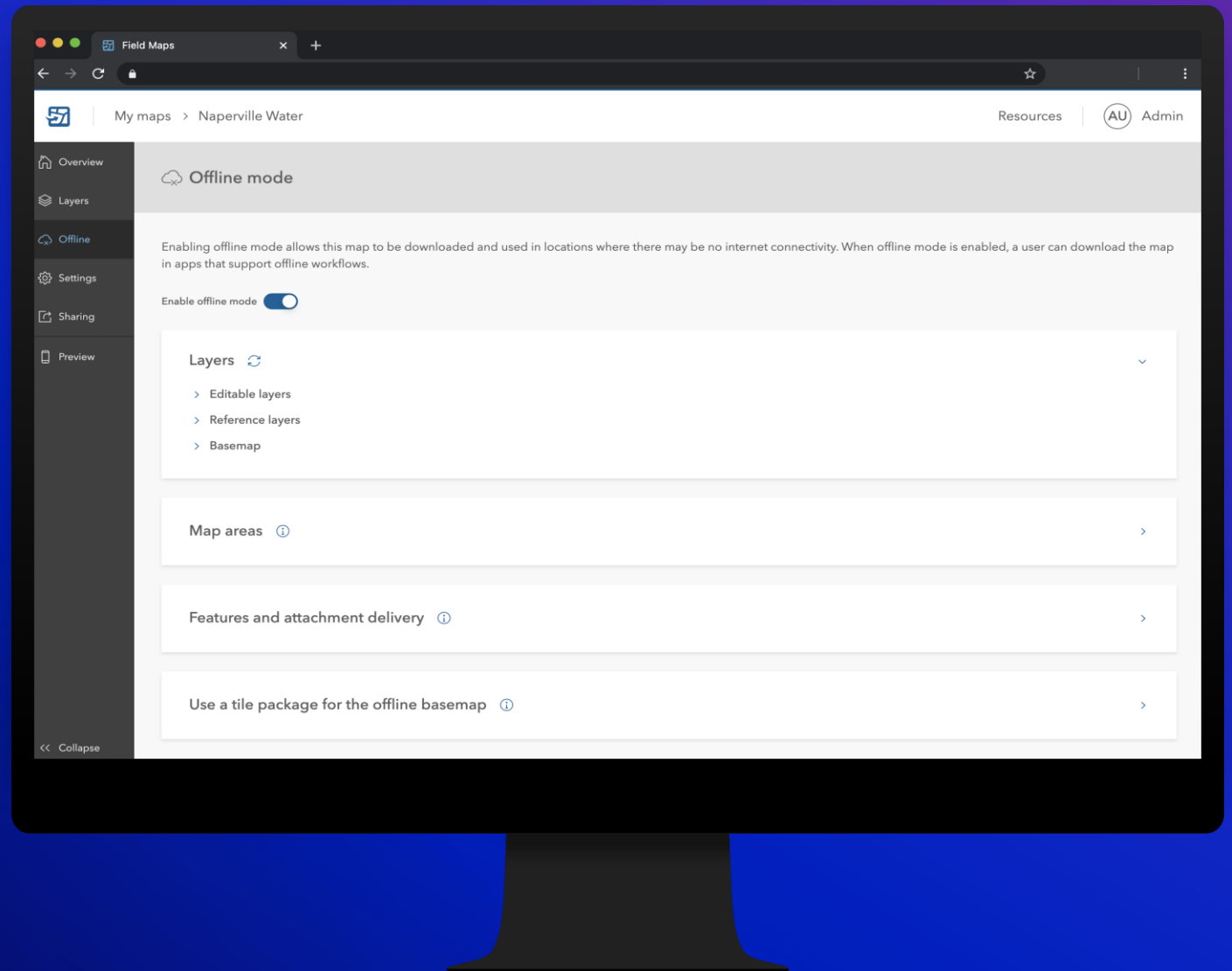
Demonstration

ArcGIS Field Maps

- 
- Read-only map viewing
 - Markup
 - Tracking
 - Capture



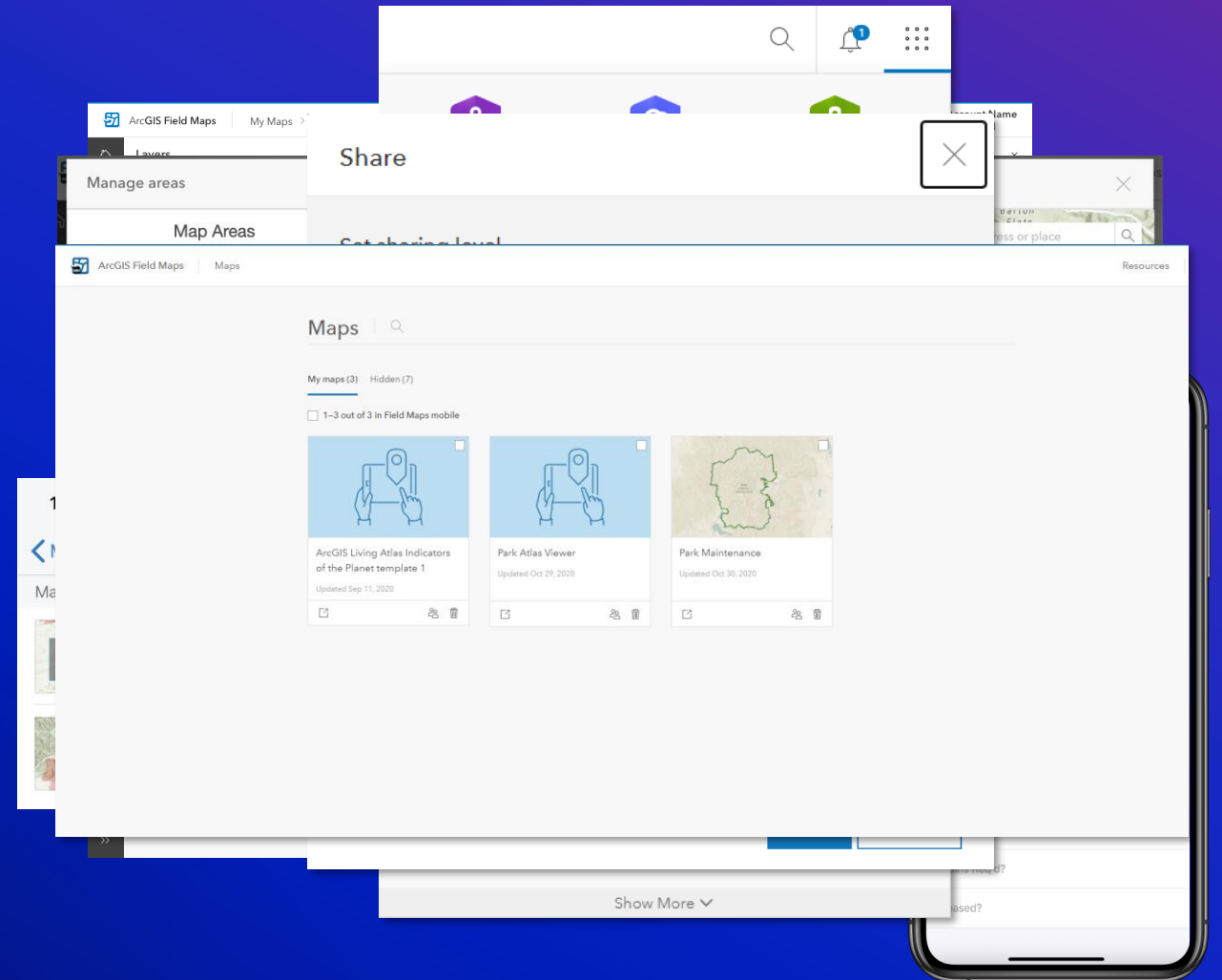
Full-feature
web
authoring
tool

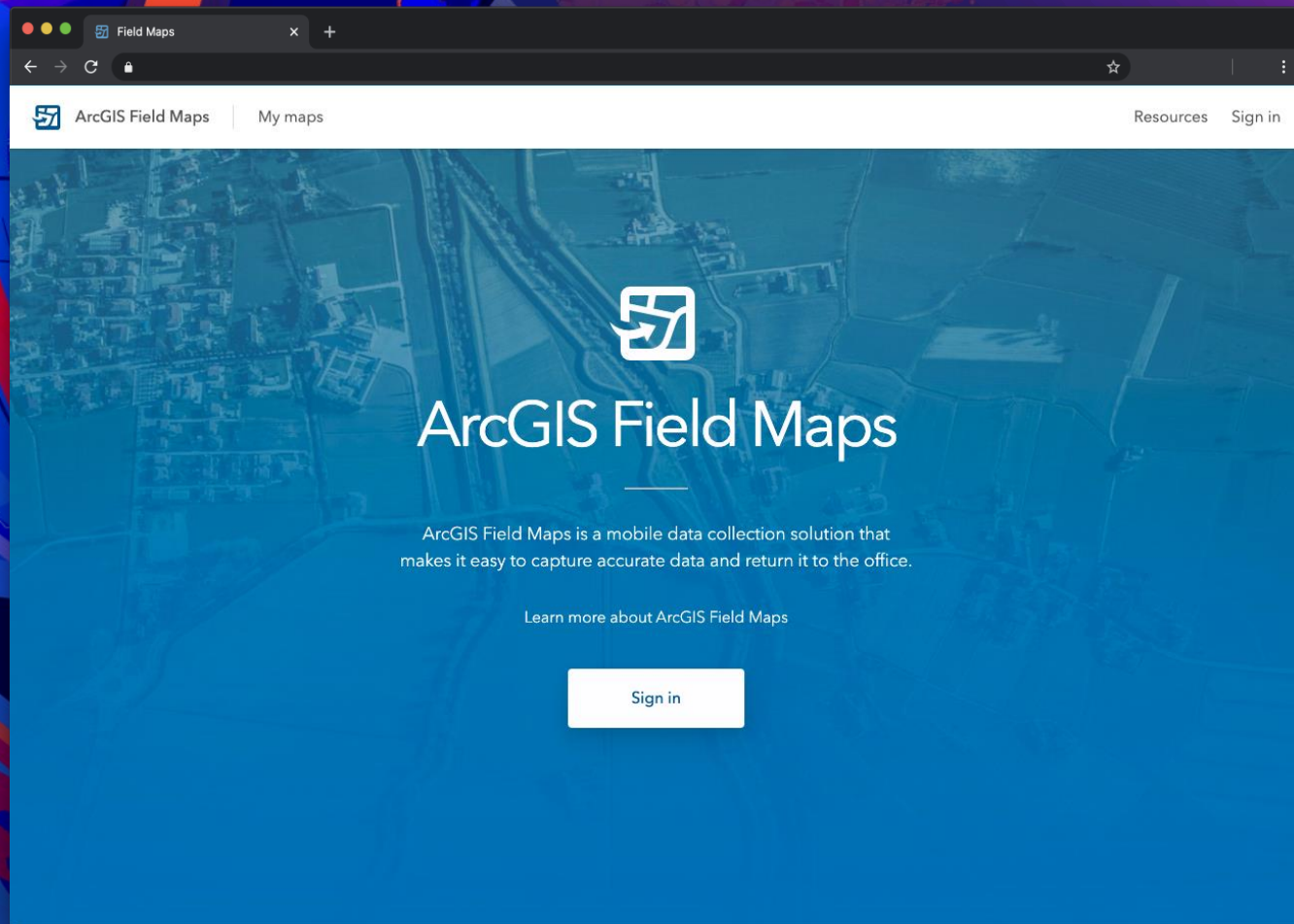




ArcGIS Field Maps | Streamlined project authoring


- Integrated into App Launcher
- Centralized experience for deploying maps
- Configure map capabilities
- Manage offline capabilities
- Share and deploy









Demonstration

ArcGIS Field Maps

- 
- Configure maps
 - Create smart forms
 - Configure offline
 - Share



ArcGIS Field Maps | User types and licensing

If you have a...	In Field Maps, you can...
 Field Worker, Creator, or GIS Pro named user	Perform inspections, create or update your asset inventory, add photos/attachments, and simplify multi-app workflows
 Viewer named user	Achieve situational awareness workflows, view dynamic web maps, use offline maps, create markup
 ArcGIS Tracker premium app license	Enable location tracking workflows, report your location in real-time, record a 'breadcrumb' trail of your location history
 ArcGIS Collector app license	Create and edit GIS data from your mobile device with high accuracy, add attachments, work offline



ArcGIS QuickCapture

Field Operations



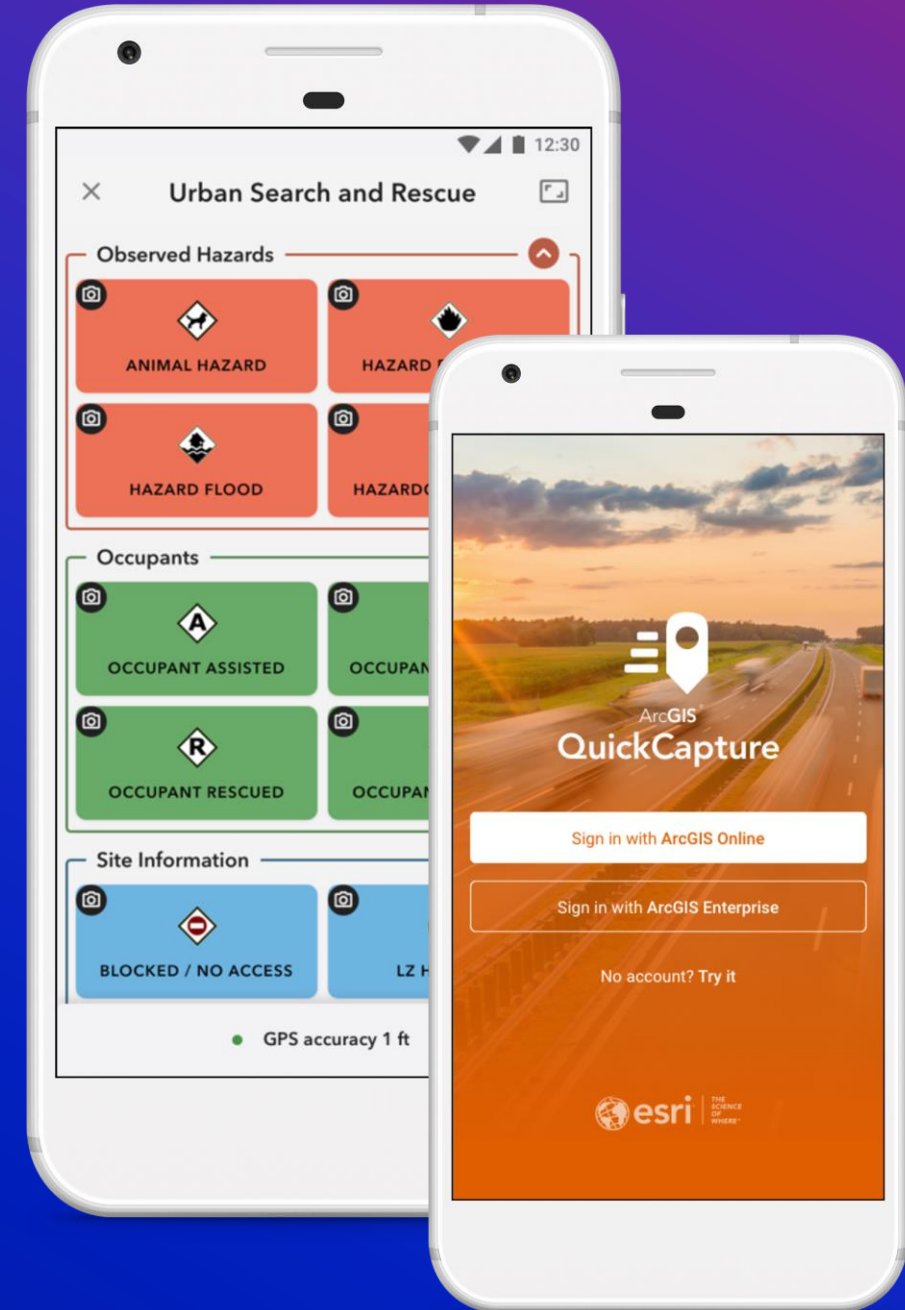
ArcGIS QuickCapture

The rapid data collection app

A “big button” mobile app

Simplest way to capture field observations

At-speed data collection workflows




×

Pre-Enumeration Building ...


Name: Kate Hess

Commercial Building




Commercial

Residential Building



Single-Family



Multi-Unit/ Apt

● GPS accuracy 15 ft

>

Demo

QuickCapture

Statistics Use Case: Pre-enumeration Building Census



- Capture building locations



- Identify zoning



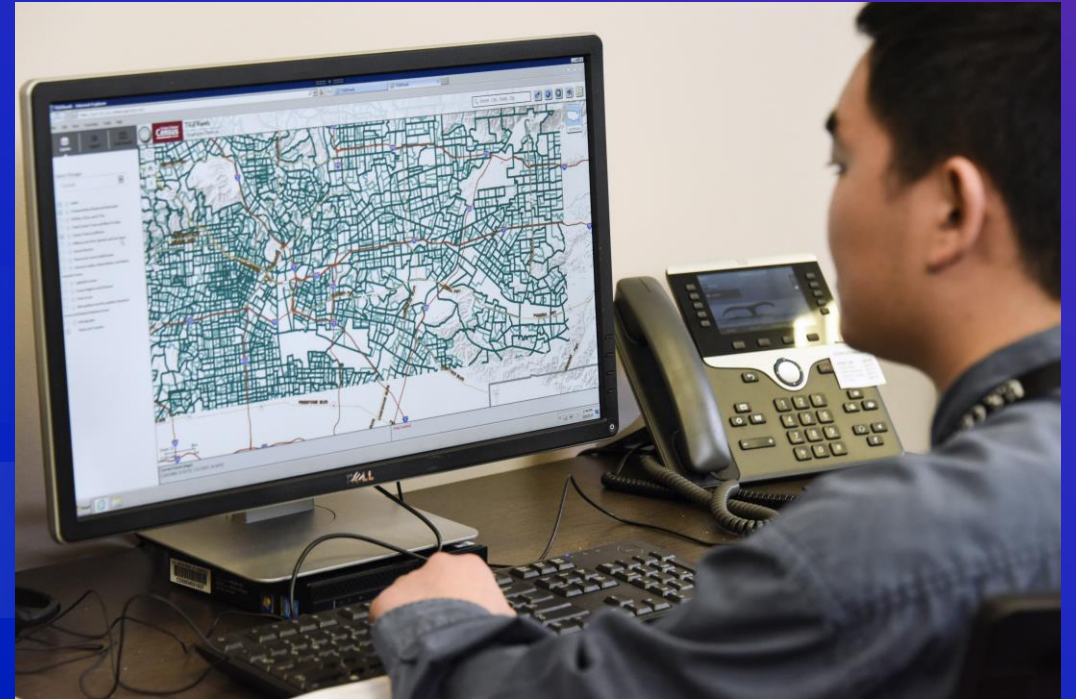
- Plan enumeration

Benefits of QuickCapture

Real time data transfer

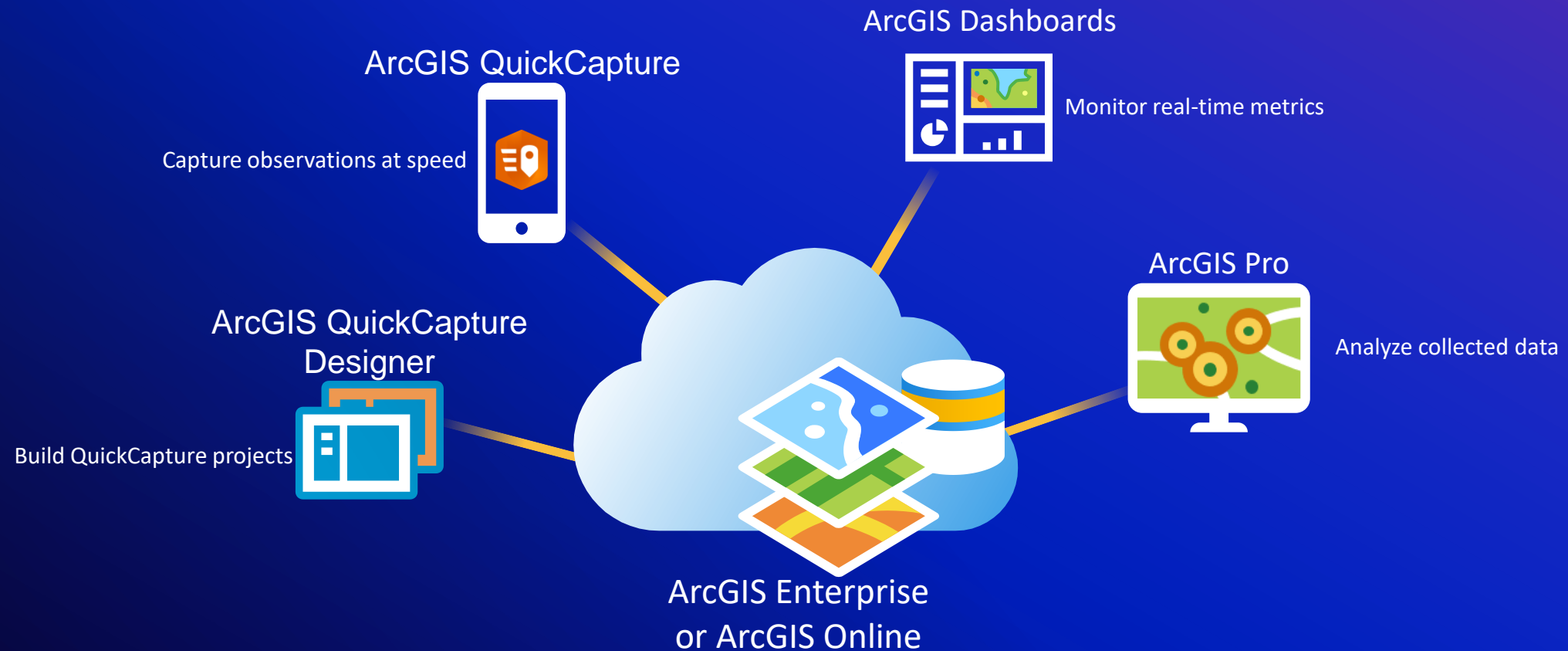
Reduce training costs

Increase efficiency



Reference Deployment

ArcGIS QuickCapture



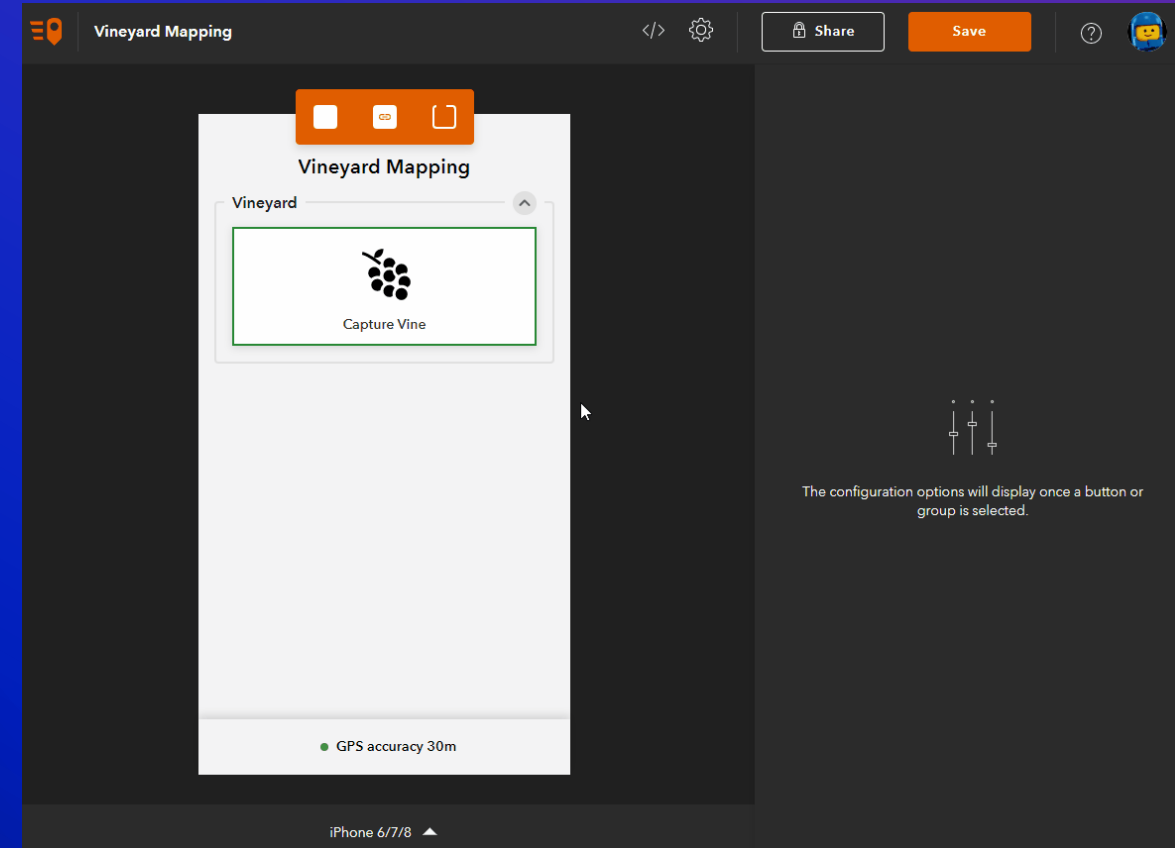
ArcGIS QuickCapture designer

Configure your own big button apps

Configure your own big button apps

From your web browser

No-code



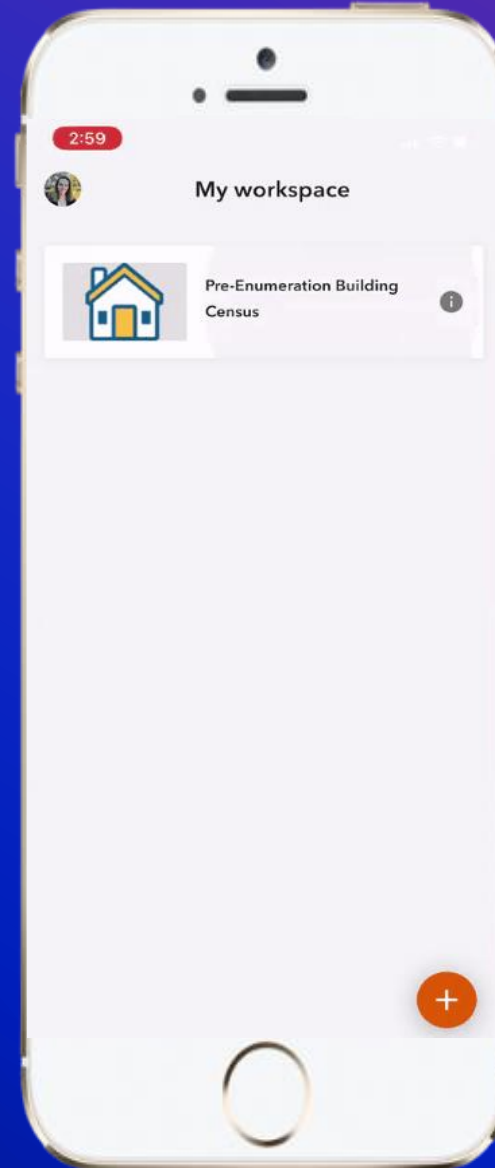
Device Variables

- Use them to automatically calculate GIS attributes when a feature is captured
 - Speed
 - Direction of travel
 - Time of capture
 - Etc.
- Over 40 variables

The screenshot displays the 'Bike Trails' application interface. The top navigation bar includes a location pin icon, the title 'Bike Trails', and icons for code, settings, share, save, help, and a user profile. The main form area is divided into sections: 'Points of Interest' with buttons for 'Bridge' (highlighted with an orange border), 'Intersection', and 'Lookout'; 'Trails Paved' with buttons for 'Advanced' (red), 'Intermediate' (orange), and 'Beginner' (green); and 'Trails Not Paved' with similar 'Advanced', 'Intermediate', and 'Beginner' buttons. A bottom section shows a camera icon and a photo preview. On the right, a sidebar contains a 'Button' label, a 'SHARE' button, a 'SAVE' button, and a 'DATA' tab. Under the 'DATA' tab, several variables are listed with 'Enter decimal' input fields: 'Direction', 'HorizontalAccuracy', 'Altitude', 'Latitude', and 'Longitude'.

User Inputs

- **Update attributes on new features**
 - Enter input after button is pushed
 - Or when the project starts
- **Can be required or optional**
- **Supports data validation rules**



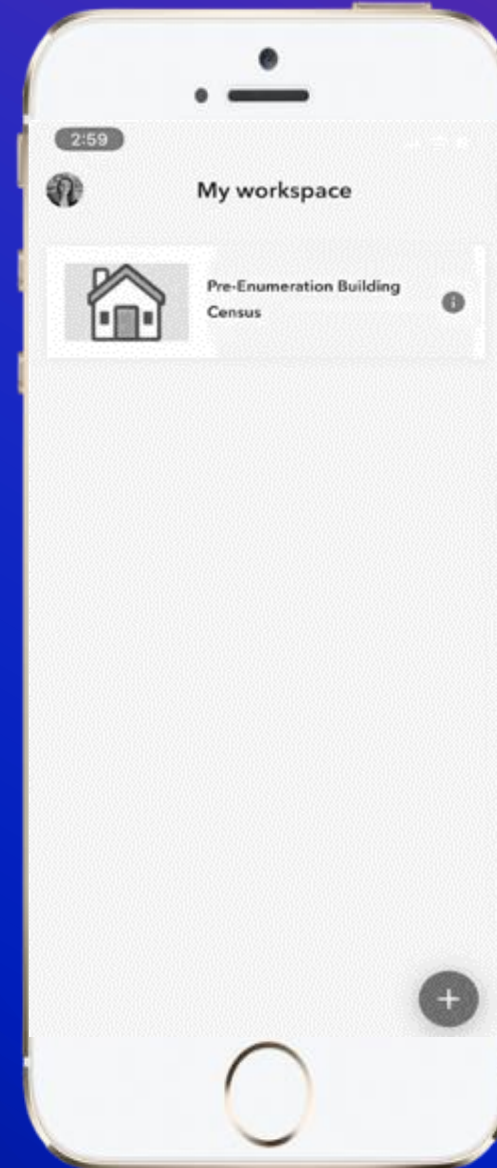
**Project
User Input**



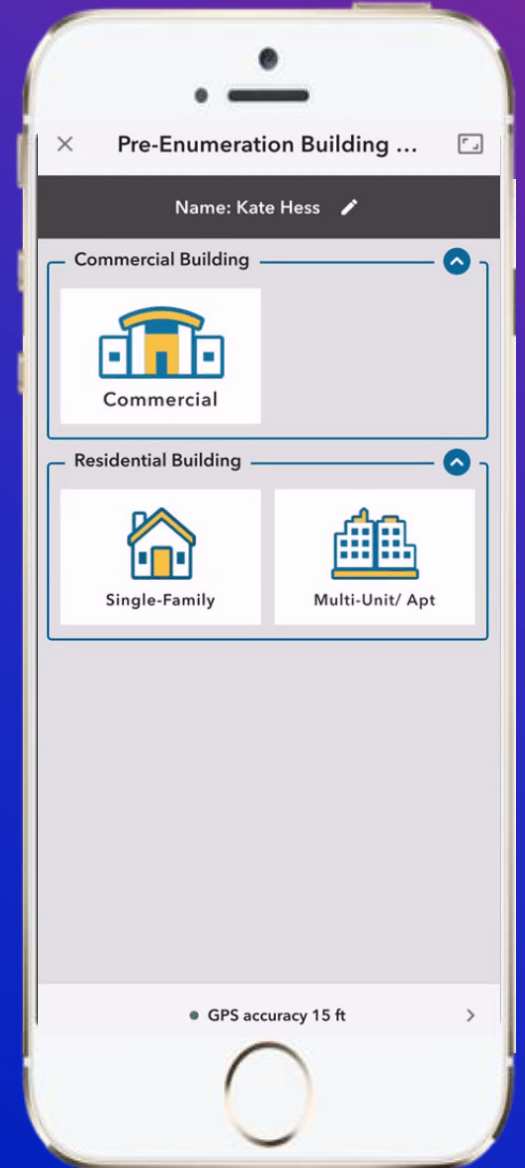
**Button
User Input**

User Inputs

- **Update attributes on new features**
 - Enter input after button is pushed
 - Or when the project starts
- **Can be required or optional**
- **Supports data validation rules**



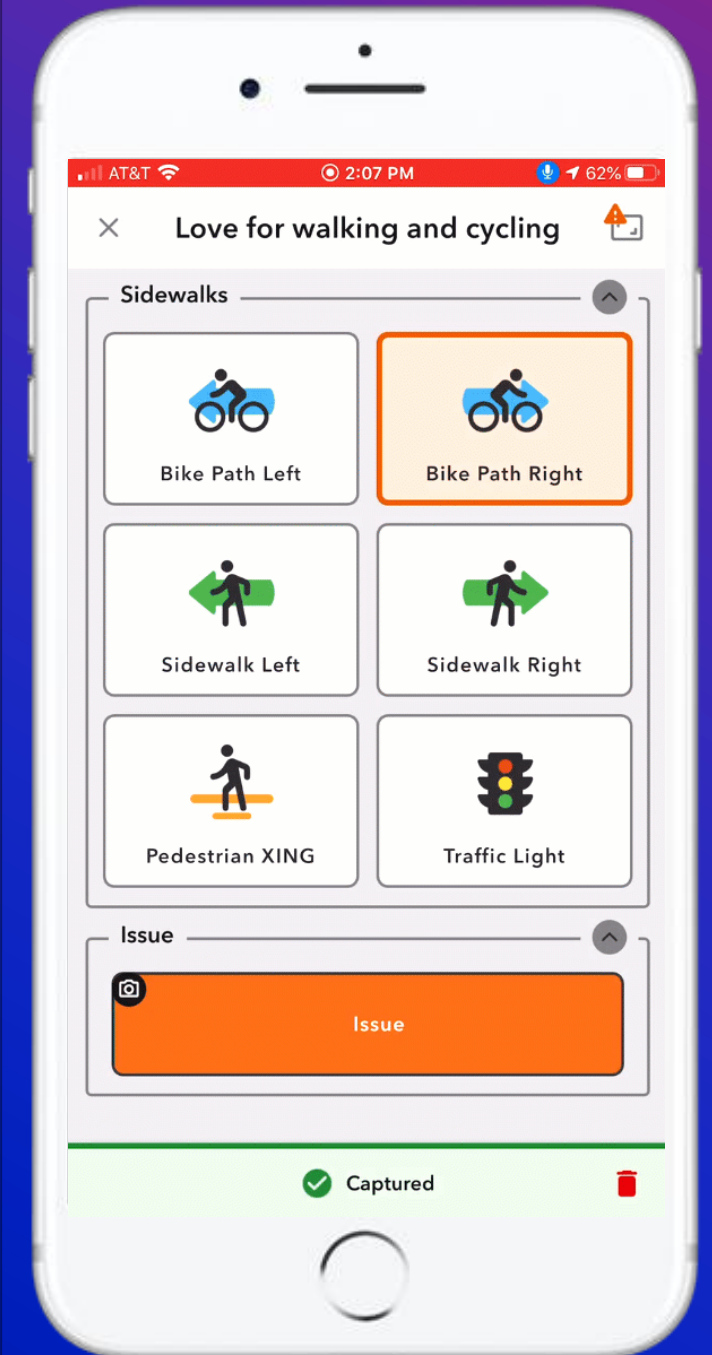
**Project
User Input**



**Button
User Input**

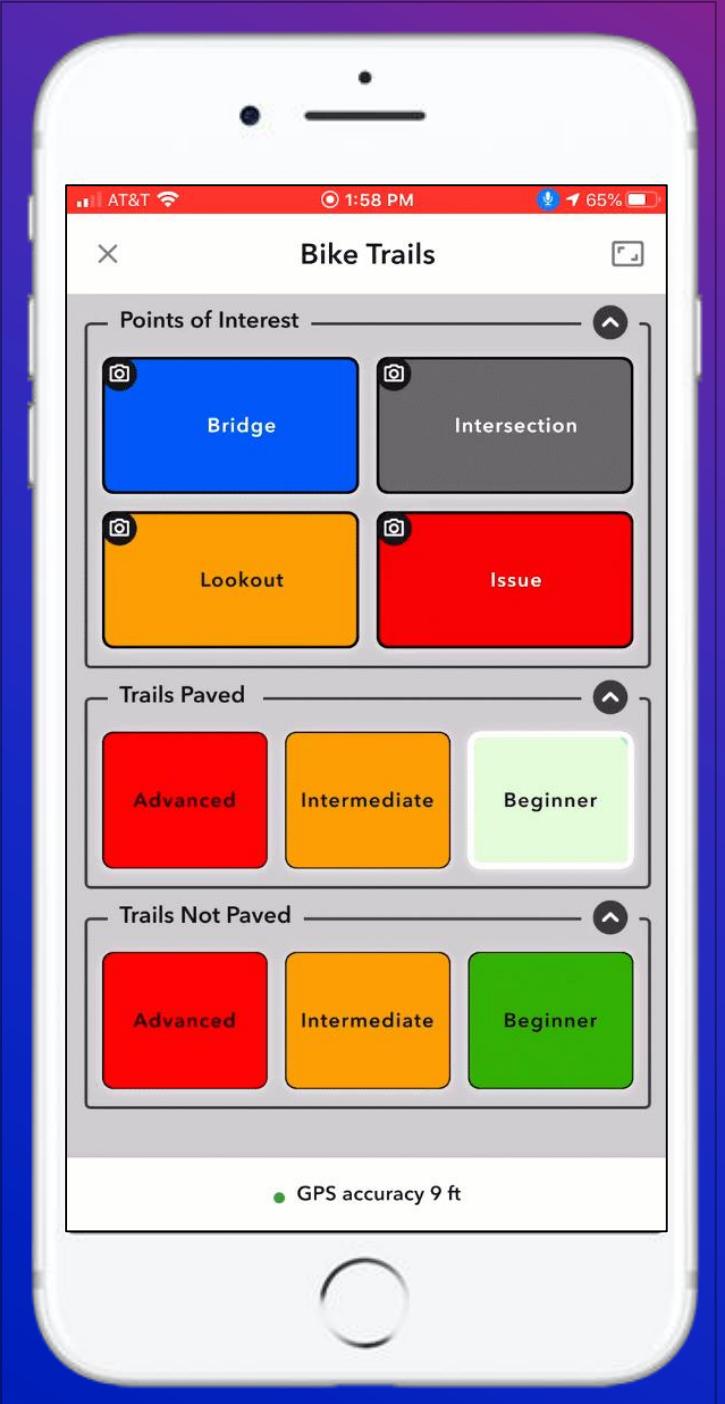
Nested Data Capture

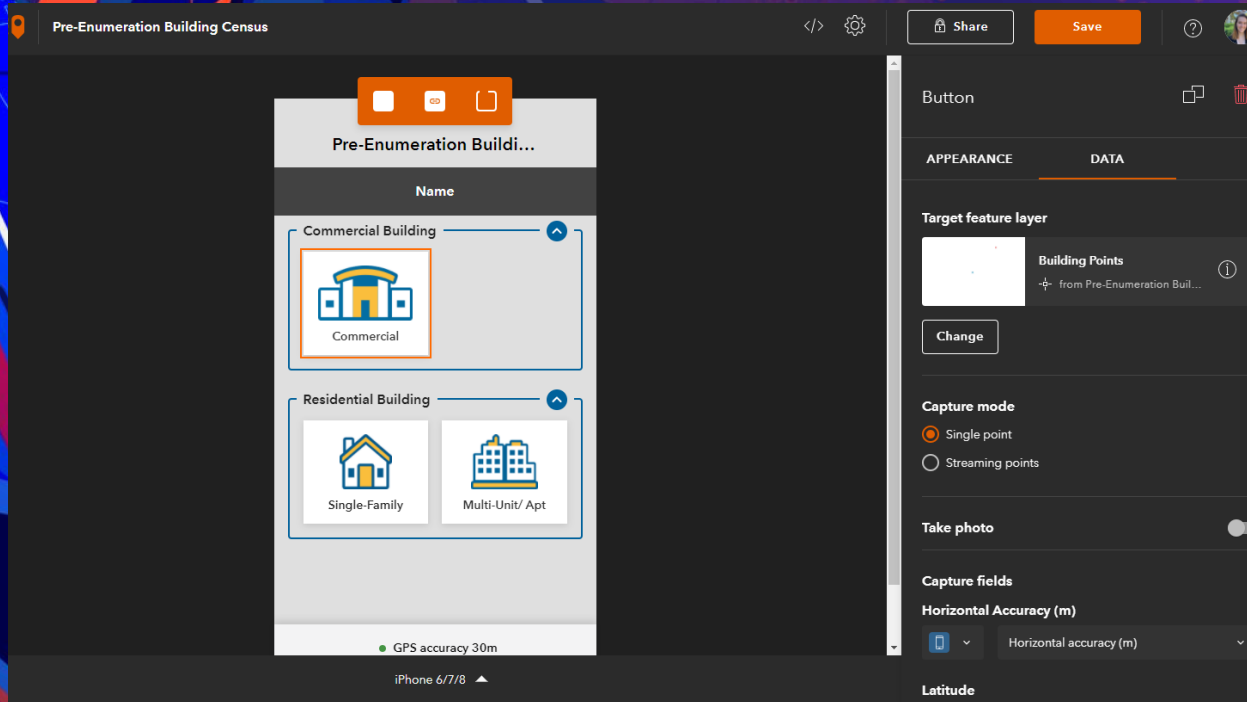
- QuickCapture supports capturing multiple observations at the same time:
 - Bike trail on the right side
 - Also on the left side
 - ...



Exclusive Groups

- You can also group buttons to capture information in a mutually exclusive manner:
 - Pavement condition good vs bad
 - Beginner trail vs intermediate



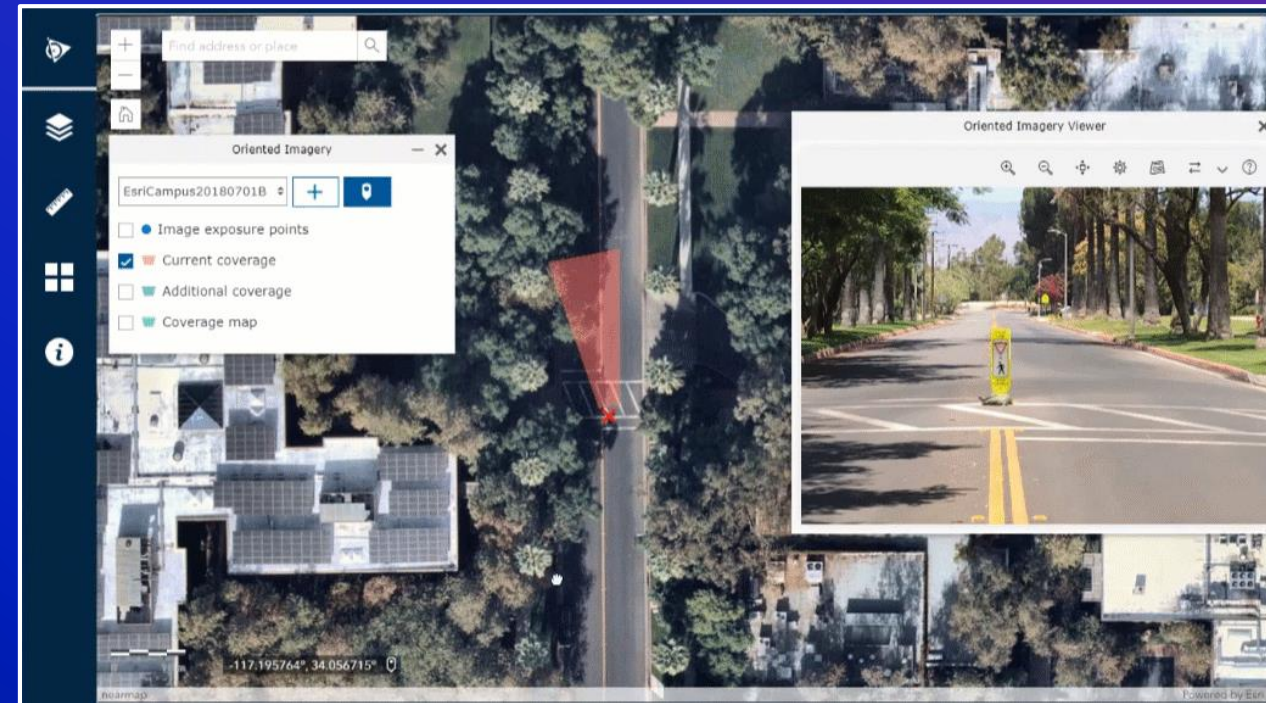


Demo

QuickCapture Designer

Field data collection meets oriented imagery

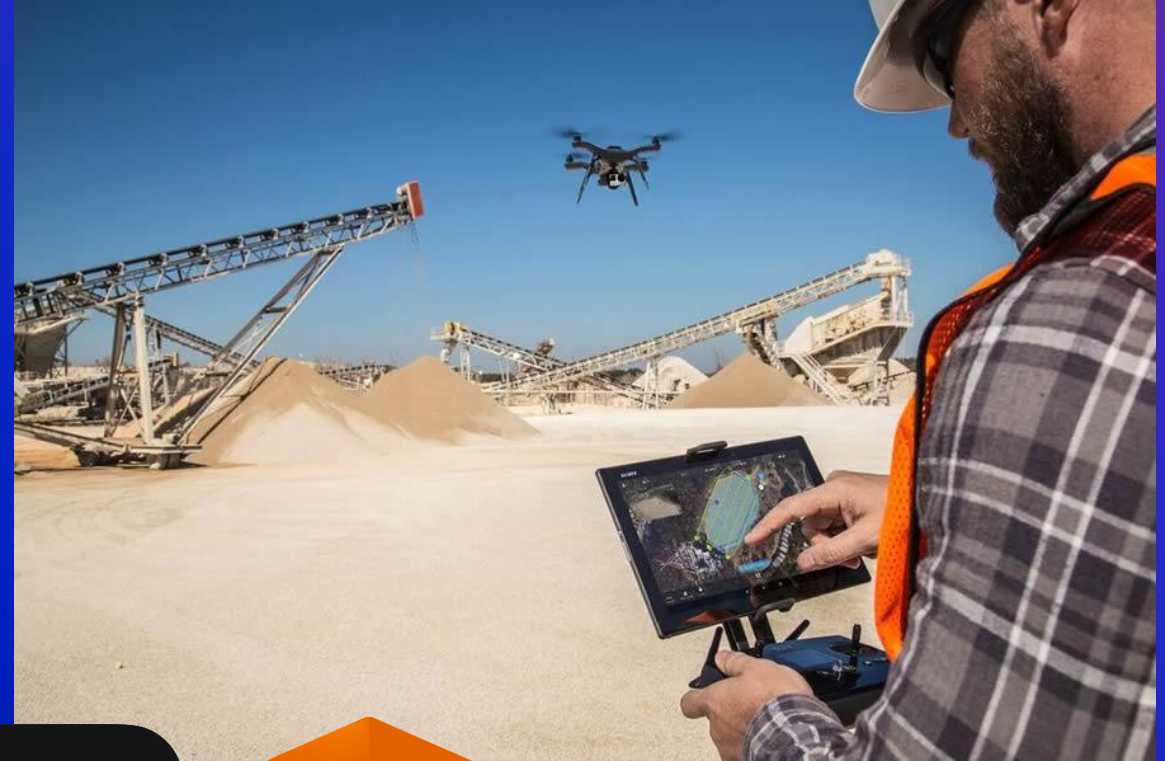
- Snap photos with the app as usual
- Explore field photos like never before
- Damage assessments
- Document construction
- Asset inventory and inspections
- Code violation reports
- Field observations



Eyes in the Sky

Field data collection with Site Scan and QuickCapture

- Leverage real time imagery and location of your UAV to collect data from QuickCapture
- Quick field observations:
 - Search & Rescue and Emergency response
 - Powerline and pipeline inspections
 - Agriculture

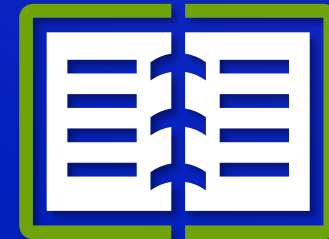
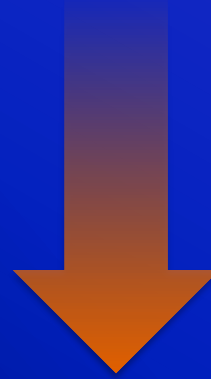
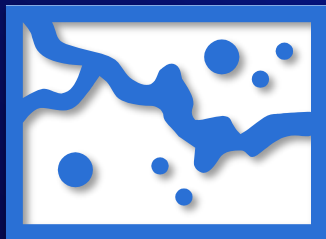


ArcGIS Survey123

Form-centric workflows



Field Operations | Which app do I choose?



Survey123 workflow



1. Create surveys



Design and publish

Connect

Web designer



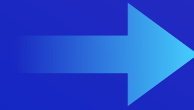
2. Get answers



Collect data

Field app

Web app



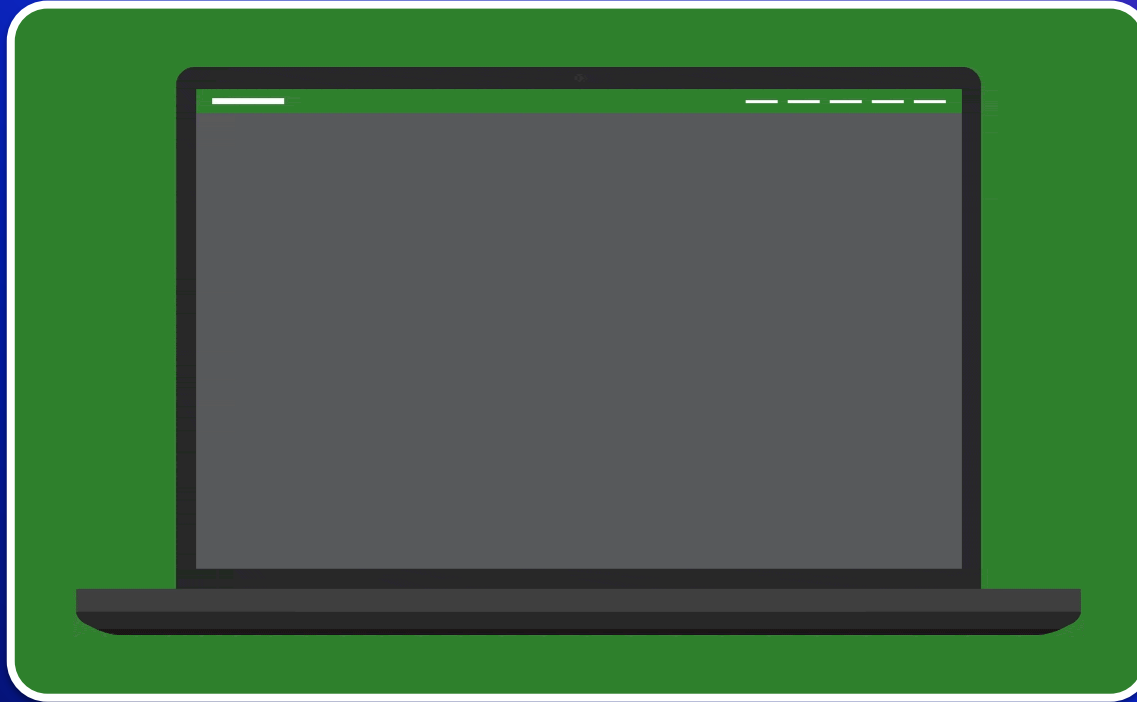
3. Analyze results



Make decisions

Website

A complete form-centric system



Make forms smart!

- Boost data capture efficiency
- Data collected in the field is available in the office in real-time
- Reduce errors
- Prepopulate responses
- Guide the respondent through the form

The image displays two versions of a data collection interface. On the left is a desktop web form titled 'Individual Assistance Field Collection Survey (Express)'. It includes a section for 'Incident Information' with a date field set to 6/10/2020, and a map section for 'Coordinates of the damage' showing a residential street with a blue location pin and latitude/longitude coordinates (Lat: 34.03833, Lon: -117.194). On the right is a mobile app interface for 'Rapid Evaluation Safety Assessment'. It features a table for reporting building conditions with radio button inputs for Minor, Moderate, and Severe damage levels. The table includes rows for Collapse, Building leaning, Structural damage, Falling hazards, and Ground slope movement. Below the table is a comments text area and a dropdown for 'Estimated Building Damage' currently set to 'None'. A green checkmark button is at the bottom right of the mobile app screen.

Individual Assistance Field Collection Survey (Express)

Incident Information

Incident Begin Date:*

6/10/2020

Coordinates of the damage:*

Map data © OpenStreetMap contributors, CC-BY-SA

Lat: 34.03833 Lon: -117.194

Rapid Evaluation Safety Assessment

Evaluation

Report building condition

	Minor / None	Moderate	Severe
Collapse	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building leaning	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Structural damage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Falling hazards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ground slope movement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Comments

Estimated Building Damage
Excluding contents

None

Create a survey

- **Survey123 web designer**
 - Runs in web browser
 - Drag-and-drop visual form builder
 - Easy to get started

The screenshot displays the Survey123 web designer interface for a 'Census Interview Form'. The interface is divided into three main sections: a central design canvas, a top navigation bar, and a right-hand configuration panel.

Top Navigation Bar: Includes tabs for 'Overview', 'Design' (currently active), 'Collaborate', 'Analyze', 'Data', and 'Settings'. Below these are icons for 'Add', 'Edit', 'Appearance', and 'Options'.

Design Canvas: Shows a form with three numbered steps:

- Step 1:** A text input field labeled 'Name*'. A small '1' is in the top left corner.
- Step 2:** A question 'What is (NAME)'s relationship to the head of household?' with ten radio button options arranged in a grid:
 - Head of Household
 - Spouse
 - Own Son/ Daughter
 - Step Son/ Daughter
 - Parent
 - Brother/ Sister
 - Nephew/ Niece
 - Son/ Daughter-in-Law
 - Grandchild
 - Parent-in-Law
 - Cousin
 - Other Relative
 - UnrelatedA small '2' is in the top left corner.
- Step 3:** A question 'Is (NAME) Zambian?' with two radio button options: 'Yes' and 'No'. A small '3' is in the top left corner.

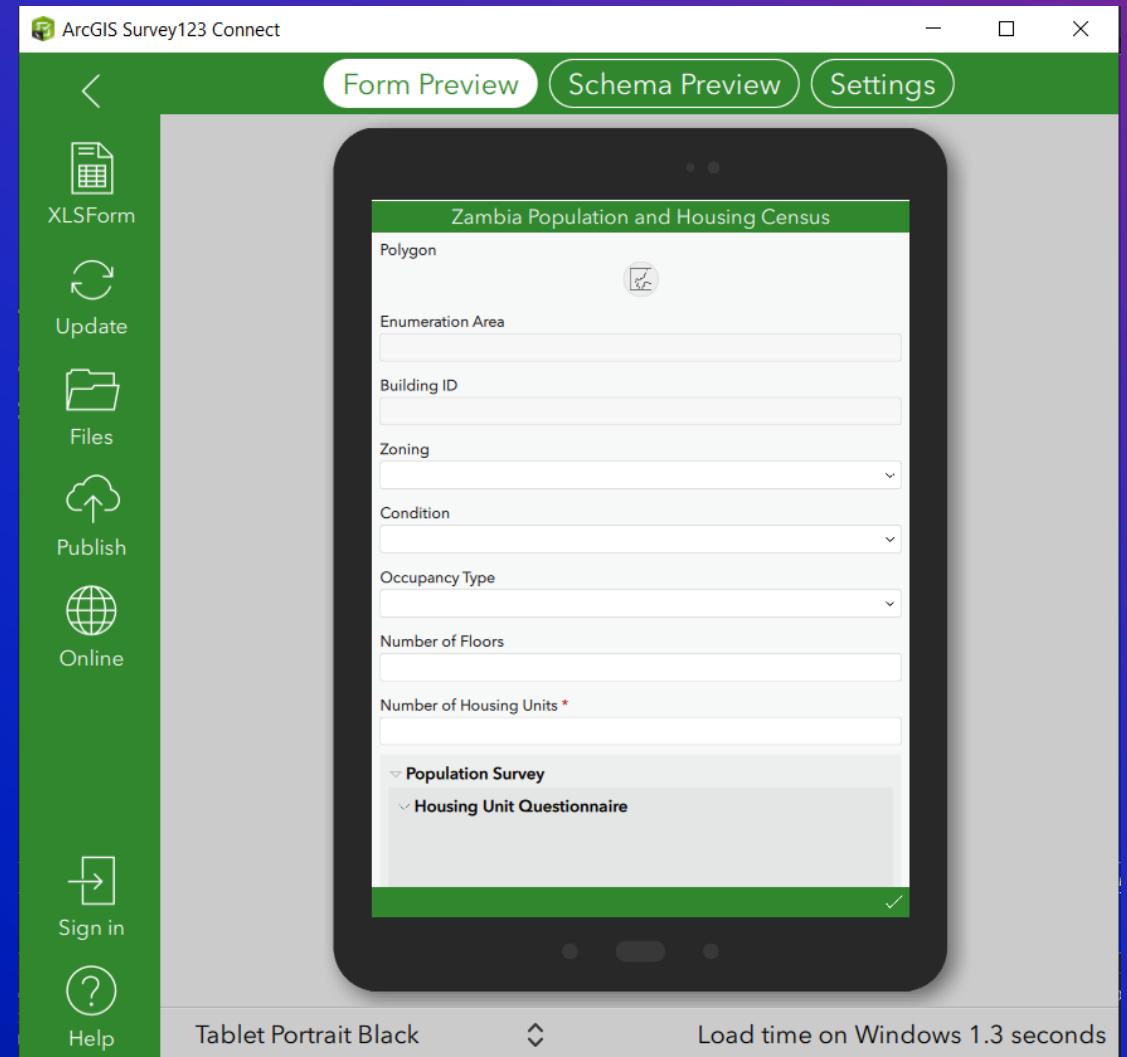
Right Panel (Single Choice Configuration):

- Label:** 'What is (NAME)'s relationship to the head of househ'
- Hint:** 'Tell user how to fill this question'
- Choices:** A list of the same ten relationship options as in Step 2, each with a radio button icon to its left. A 'Batch Edit' button is at the top right of this list.
- Options:** A section for configuring the choices, including a toggle for 'Show choices in random order (exclude "Other")' and a list of the same ten relationship options, each with a plus/minus icon to its left.

Create a survey

- **Survey123 Connect**

- Desktop application used in combination with Microsoft Excel
- Define the content, look, and behavior of the smart form
- Maximum level of control over form design



ArcGIS Survey123

Local Website Installer



Census Interview Form

OverviewDesignCollaborateAnalyzeDataSettings

Census Interview Form

1Name*

2What is (NAME)'s relationship to the head of household?

Head of Household

Spouse

Own Son/ Daughter

Step Son/ Daughter

Parent

Brother/ Sister

Nephew/ Niece

Son/ Daughter-in-Law

Grandchild

Parent-in-Law

Cousin

Other Relative

Unrelated

3Is (NAME) Zambian?

Yes

No

+

+

+

+

Single Choice

Label

What is (NAME)'s relationship to the head of househ

Hint

B A

Tell user how to fill this question

Choices

Batch Edit

Show choices in random order (exclude "Other")

Head of Household

Spouse

Own Son/ Daughter

Step Son/ Daughter

Parent

Brother/ Sister

Nephew/ Niece

Son/ Daughter-in-Law

Grandchild

+

+

+

+

+

+

+

+

+

+

Demo

Survey123 Web Designer

Share your survey

- **Private surveys**

- Shared with a well-known group of users (secured access)
- Requires one ArcGIS account per field user
- Can use editor tracking capabilities
- Ideal for sensitive data and for tracking survey submissions and edits



Share your survey

- **Public surveys**
 - Shared with everyone
 - No need for ArcGIS accounts – anyone can submit data
 - Ideal for crowdsourcing initiatives



XLSForm

Expanded support

Robust and proven specification for designing smart forms.

The conceptual foundation for the smart form capabilities in Survey123 and other smart form solutions in the market.

XLSForm common features:

- Rich set of question types
- Conditional visibility of questions and groups
- Multi-page surveys
- Grid layouts
- Multilingual surveys
- Filtered lists
- Calculations
- Constraints...

type	name	label	hint	readonly	default	calculation	con
geoshape	lusakabuildingpolygons_polygon	Polygon					
integer	eanum	Enumeration Area		yes			
integer	buildingid	Building ID		yes			
select_one Zoning	zoning	Zoning					
select_one Condition	condition	Condition					
select_one OccupancyType	occupancytype	Occupancy Type					
integer	numfloors	Number of Floors					
integer	numunits	Number of Housing Units					
begin repeat	popsurvey_r	Population Survey					
begin repeat	housingunits_r	Housing Unit Questionnaire					
integer	unitno	Unit/ Apt Number					
text	total_persons	How many people are usual residents of this household?					
begin repeat	householdroster_r	Household Roster					
note	rosternote	Add all household members to roster before proceeding to					
text	last_name	Last Name					
text	first_name	First Name					
end repeat		householdroster_r					
begin repeat	individuals_r	Individual Questionnaire					
hidden	person1	person1				pulldata('@javascript', 'Country_fam	
hidden	person2	person2				pulldata('@javascript', 'Country_fam	
hidden	person3	person3				pulldata('@javascript', 'Country_fam	
hidden	person4	person4				pulldata('@javascript', 'Country_fam	
hidden	person5	person5				pulldata('@javascript', 'Country_fam	
hidden	person6	person6				pulldata('@javascript', 'Country_fam	
hidden	person7	person7				pulldata('@javascript', 'Country_fam	
hidden	person8	person8				pulldata('@javascript', 'Country_fam	
hidden	person9	person9				pulldata('@javascript', 'Country_fam	
hidden	person10	person10				pulldata('@javascript', 'Country_fam	
hidden	count_me	count_me				1	
calculate	position	position				once(count(\$count_me))	
calculate	thisname	thisname				pulldata('@javascript', 'Country_fam	
select_one service_8915fc41c1194ab8a5196024b742eb2a_cvd_relationtohof	relationtohof	What is \$(thisname)'s status within the household?					
select_one service_8915fc41c1194ab8a5196024b742eb2a_cvd_relationship	relationship_pers1	How is \$(thisname) related to \$(person1)?					
select_one service_8915fc41c1194ab8a5196024b742eb2a_cvd_relationship	relationship_pers2	How is \$(thisname) related to \$(person2)?					
select_one service_8915fc41c1194ab8a5196024b742eb2a_cvd_relationship	relationship_pers3	How is \$(thisname) related to \$(person3)?					
select_one service_8915fc41c1194ab8a5196024b742eb2a_cvd_relationship	relationship_pers4	How is \$(thisname) related to \$(person4)?					

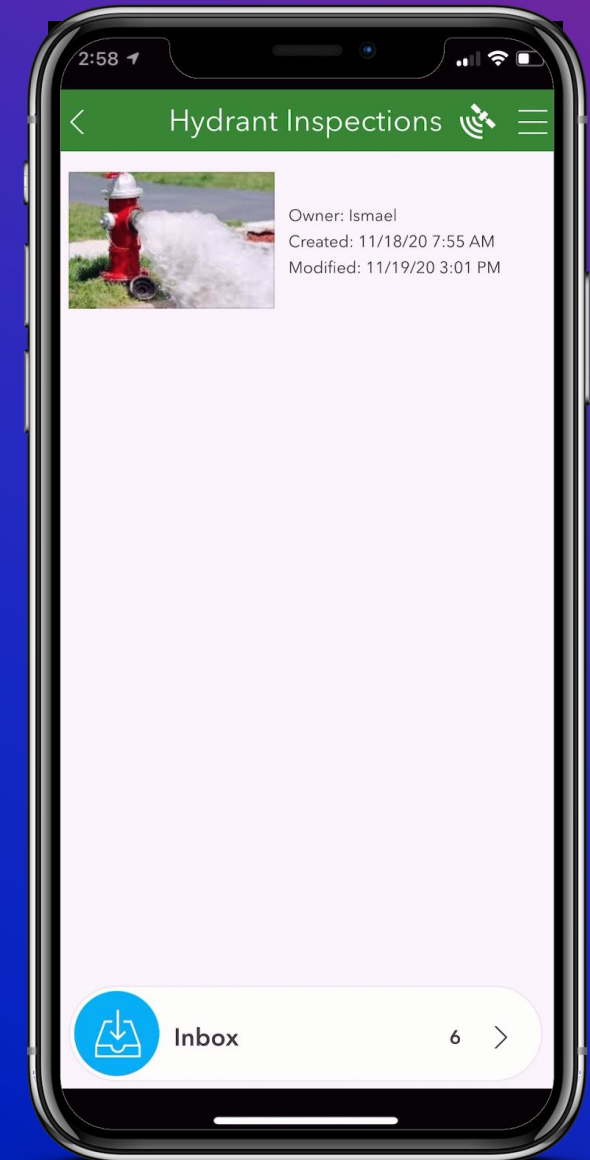
Inbox

Allows you to:


- Use a map and a list to explore existing data
- Model a to-do list (assignments) within the Survey123 app
- Navigate to existing assets or assignments

What's new:

- Use the Inbox to view and/or edit data
- Copy record from Inbox
- New search and barcode filter
- Direction and distance indicators
- Faster



Zambia Population and Housing Census

Polygon 

Enumeration Area

Building ID

Zoning
Residential



Condition
Good Condition

Occupancy Type

☐ Single Household
☐ Multiple Housing Units
☐ Non-Residential
☐ Vacant

Number of Floors

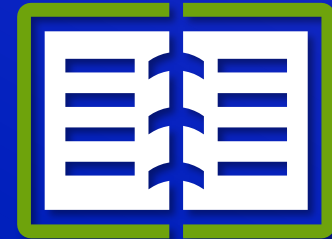
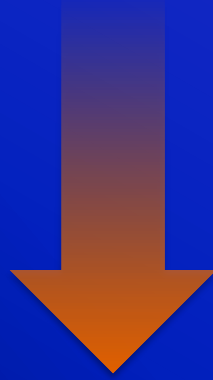
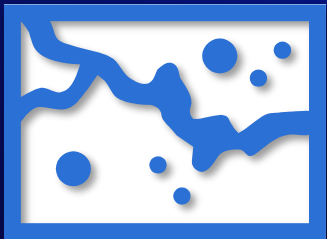
Number of Housing Units *

 **Population Survey** 

Demo

Census with Survey123 Connect

Field Operations



Resources

ArcGIS Field Maps

[Get to know ArcGIS Field Maps](#)

[5 things to try with ArcGIS Field Maps](#)

[ArcGIS Field Maps Migration Guide](#)

ArcGIS QuickCapture

[Get started with ArcGIS QuickCapture](#)

[Create a project](#)

[Capture a record](#)

ArcGIS Survey123

[Get started with ArcGIS Survey123](#)

[Create your first survey](#)

[XLSForm essentials](#)





esri®

THE
SCIENCE
OF
WHERE®