

ArcGIS Field Maps

Jeff Shaner, Carlo Lastimoza-Dooley

ENERGY RESOURCES GIS CONFERENCE 2022

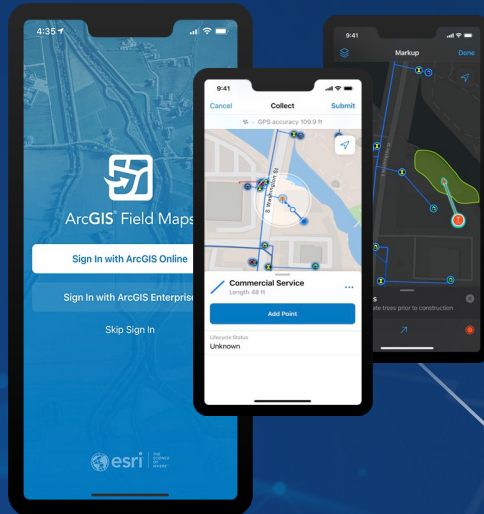


Field Operations

Location-enabling all aspects of fieldwork

Comprehensive Field App

ArcGIS Field Maps



Geocentric workflows:

- Map Viewing & Markup
- Smart Form Data Collection & Editing
- Location Sharing
- *Workforce coordination

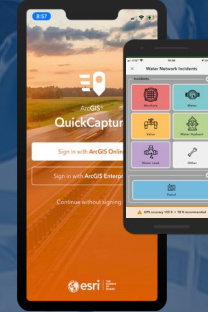
Specialized Data Collection Apps

ArcGIS Survey123



Form-centric data collection for mobile & web

ArcGIS QuickCapture



Fast Observation Capture with Location Sharing & Oriented Imagery

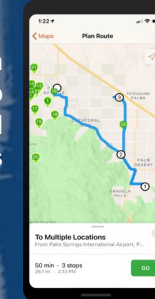
Operational Awareness

ArcGIS Dashboards



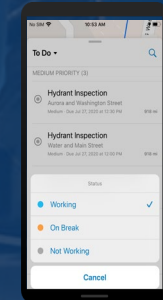
Fieldwork Management Apps*

ArcGIS Navigator



Turn by turn navigation to addresses and assets

ArcGIS Workforce



Workforce coordination between field and office

*ArcGIS Workforce & ArcGIS Navigator are on the roadmap to be integrated into ArcGIS Field Maps.

Field Operations

Our Mission

To digitally enable mobile workflows with **location technology** so field work can be completed **faster**, more **efficiently**, with **better return on investment**.



Field Maps Strategy

Transforming five apps into one

Included in 4Q 2020 Release



ArcGIS Collector*



ArcGIS Explorer*



ArcGIS Tracker

Coming Soon!



ArcGIS Workforce



ArcGIS Navigator



** ArcGIS Collector & Explorer on Windows do NOT have a retirement date.

Field Maps: Benefits

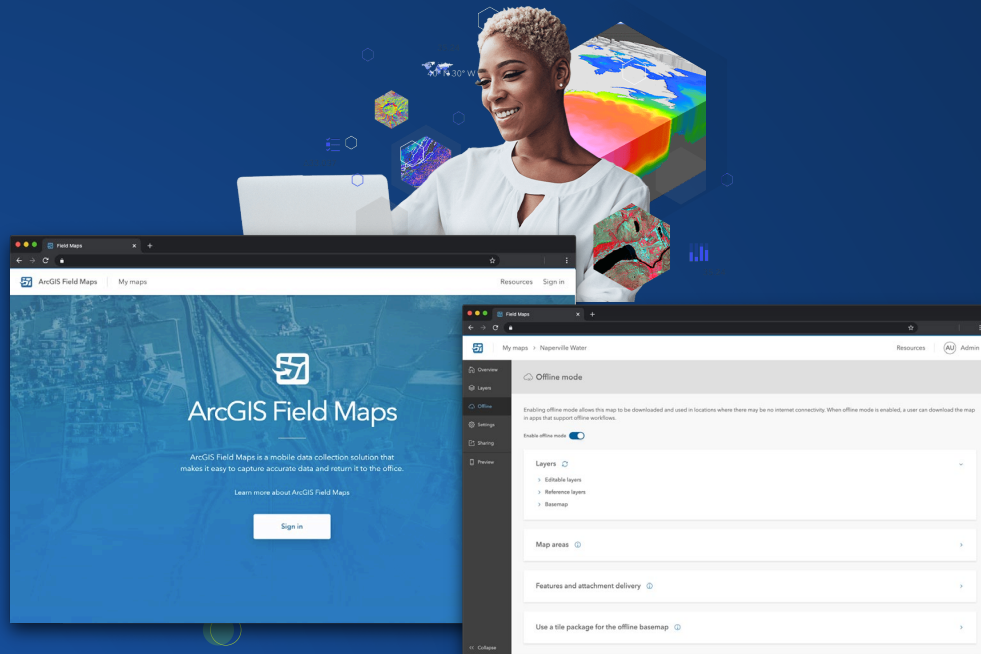
Streamlined workflows through a single app



Field Maps Components

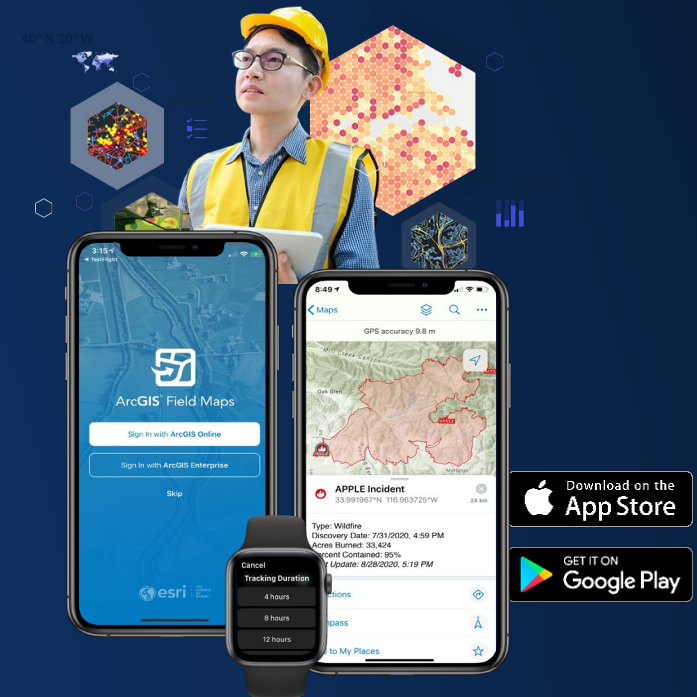
Prepare Maps for the Field

Field Maps web app



Do Work in the Field

Field Maps mobile app



Field Maps Mobile App

Do Work in the Field

Who is it for?

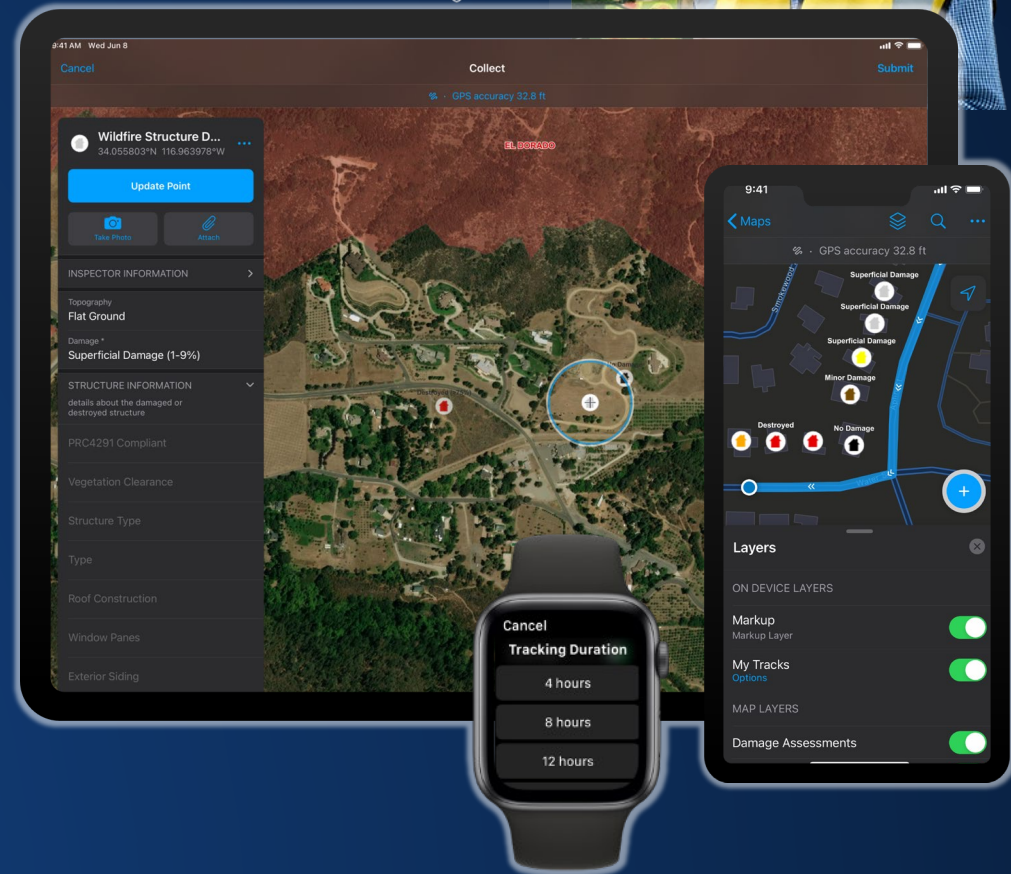
- Mobile workers – various types of work

Requirements

- Android 8.0 or later / iOS 13.5 or later

Capabilities

- View and search maps
- Markup the map and share with others
- Collect and update data, with high accuracy
- Record and share location, with Apple watch support
- View Indoor maps
- Offline capabilities



Field Maps Web App

Prepare Maps for the Field

Who is it for?

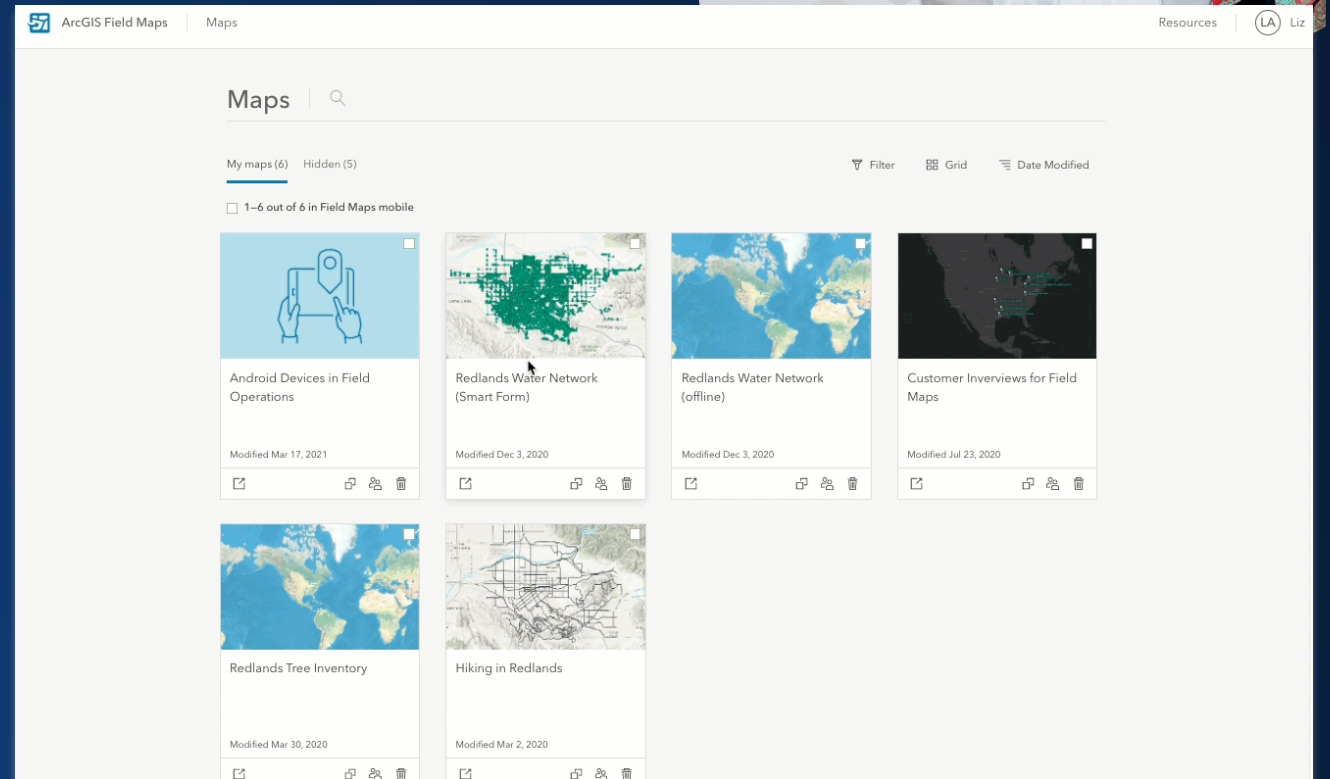
- GIS Analysts – configure and deploy maps

Requirements

- ArcGIS Online or ArcGIS Enterprise 10.8.1+
- Supported browsers (minus IE 11)
- Create privilege required
- Maps

Capabilities

- Configure map properties & settings
- Configure your content (layers, tables)
- Manage feature templates
- Create smart forms
- Manage offline experience
- Share and deploy maps

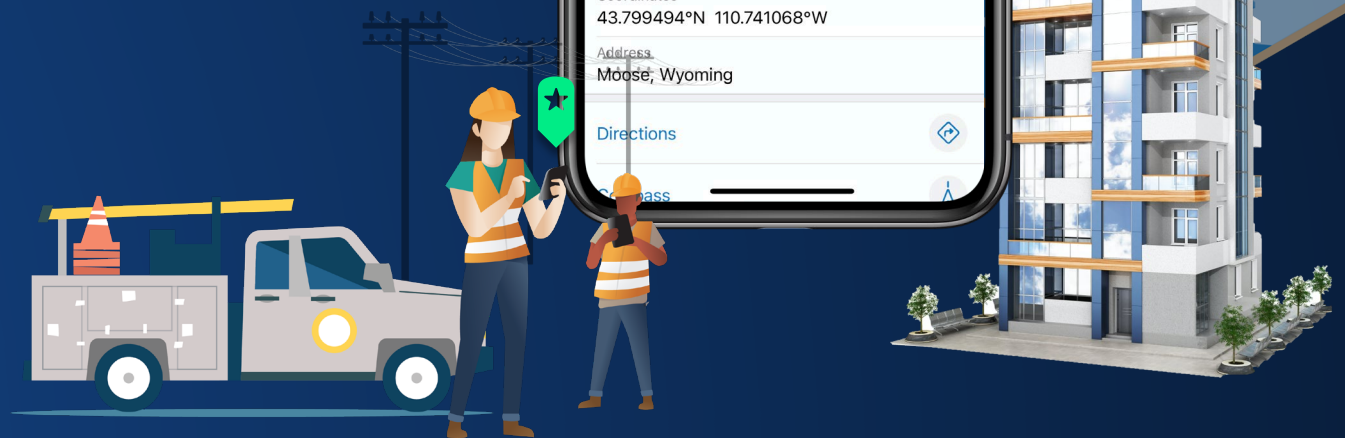
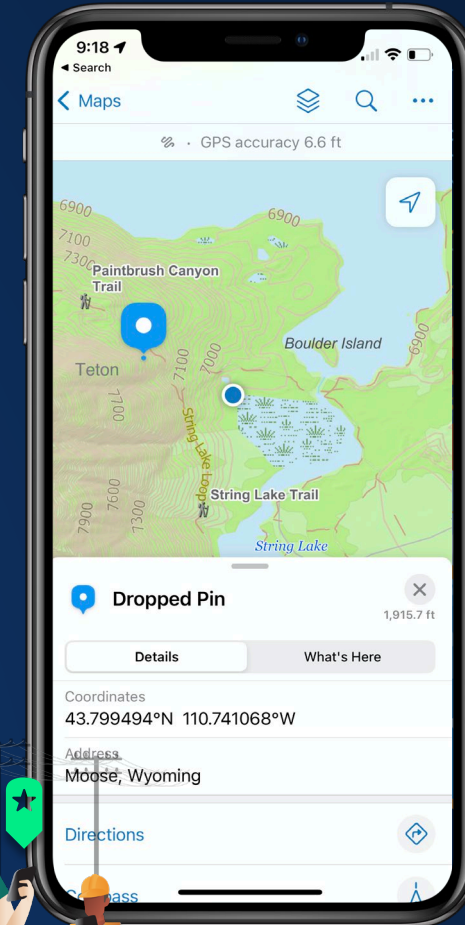


Field Maps: View Maps

Spatial awareness for mobile workflows

Know what's around you, know where you are, locate assets and information about them, even in remote areas.

- Rich interactive maps
- Powerful map tools
- Accurate up-to-date information



Map Viewing Tools

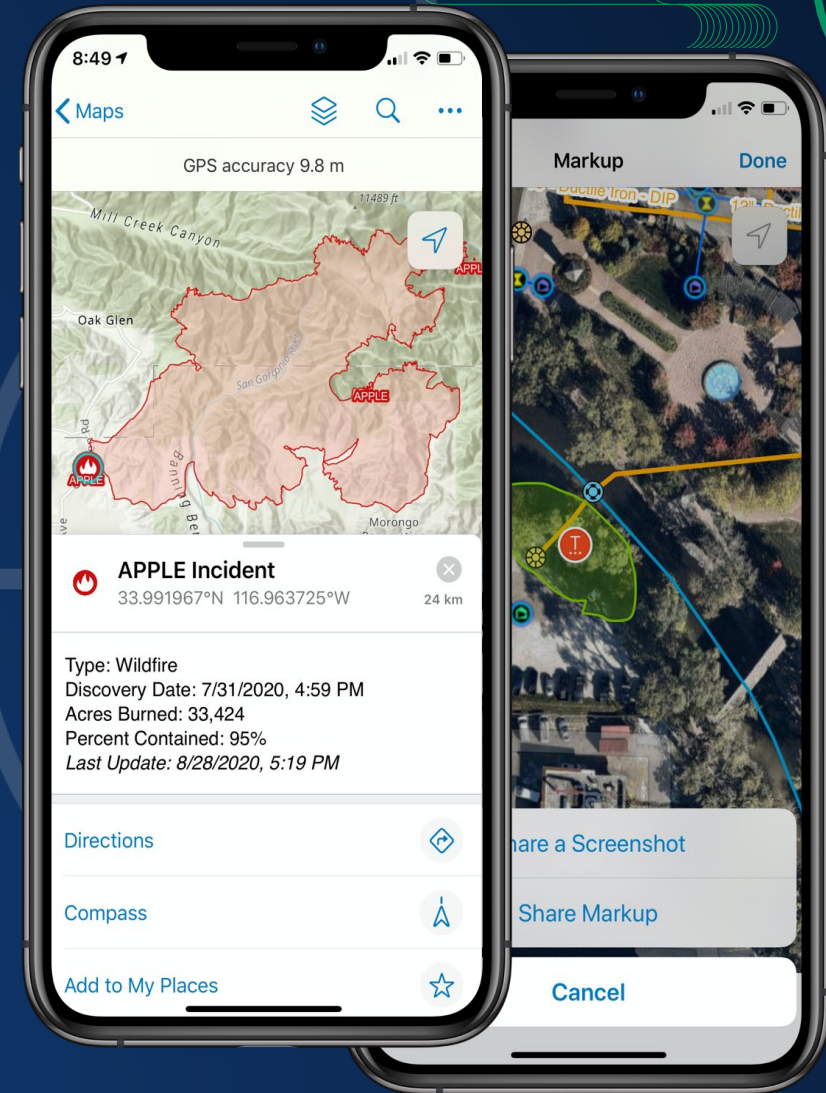
Spatial awareness for mobile workflows

- Map viewing

- View rich cartographic maps, update in real-time
- View your current location (GPS)
- Search (locations, coordinates, features)
- Support for Indoor maps
- Basemaps, Bookmarks, Layers, Legend
- Measure (lines, areas)
- Share maps, markup
- Sync map changes, Auto-sync
- Get driving directions
- Locate using a Compass

- Map markup and notes

- Freehand sketch, marker placement on the map
- Share peer-to-peer, by email, to organization

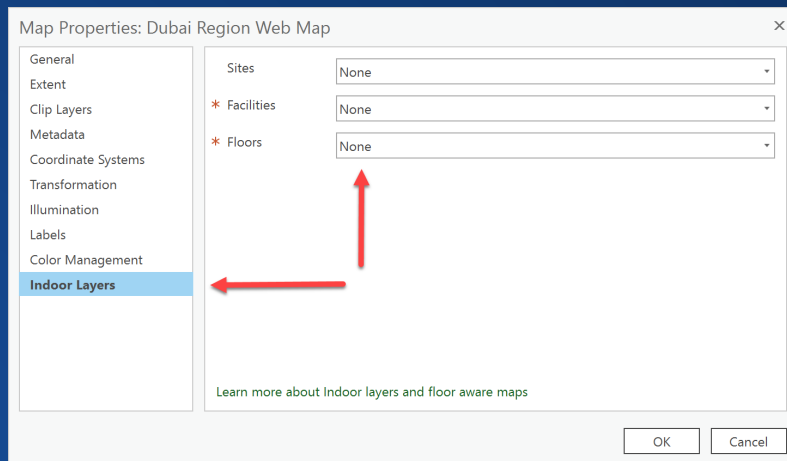


Indoor Maps

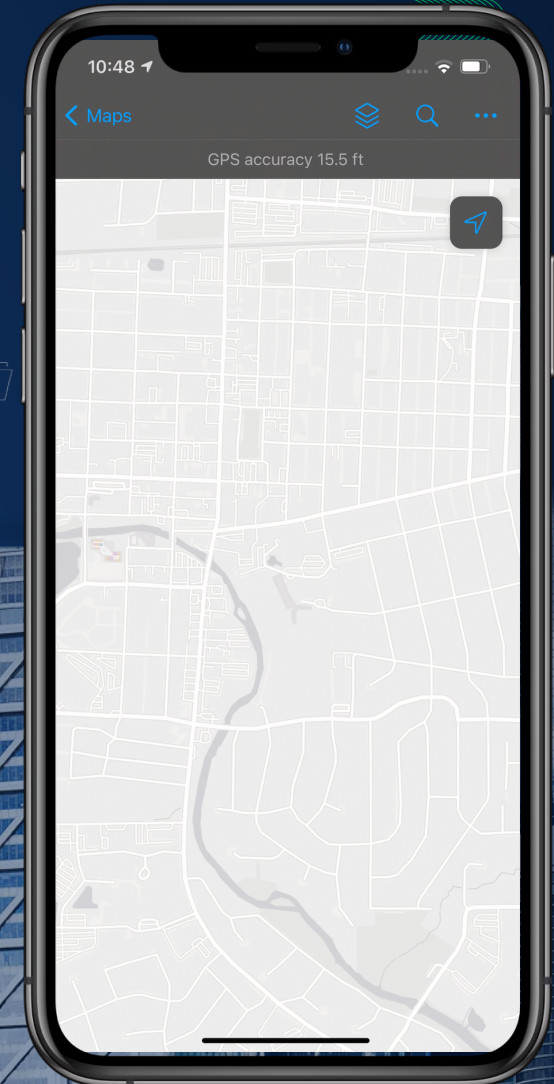
Building floor awareness

ArcGIS Field Maps supports the ArcGIS Indoors information model

- Map packages
- Web maps
- Publish maps using the ArcGIS Indoors extension for ArcGIS Pro



- Floor picker below GPS tool
- Floor panel shows floor details



Indoor floor awareness video

Linear Referencing

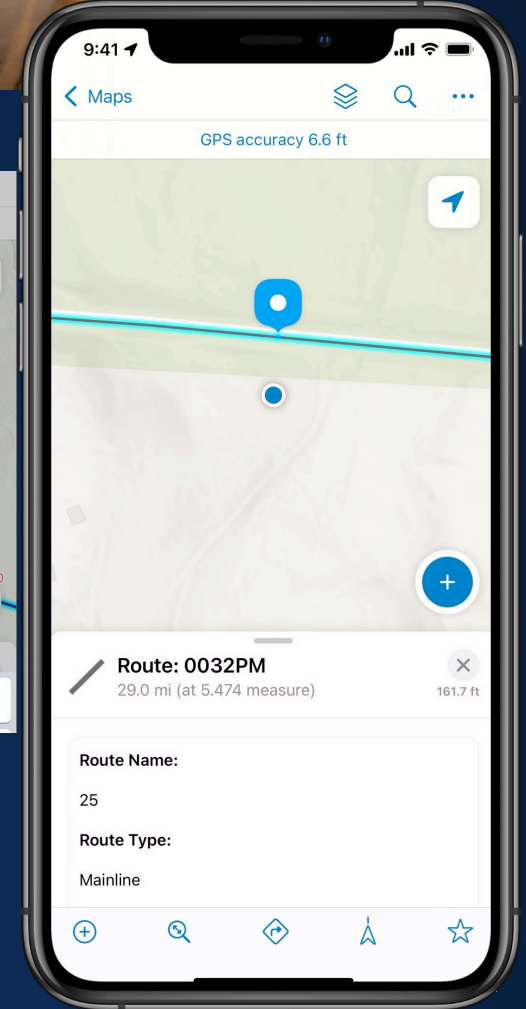
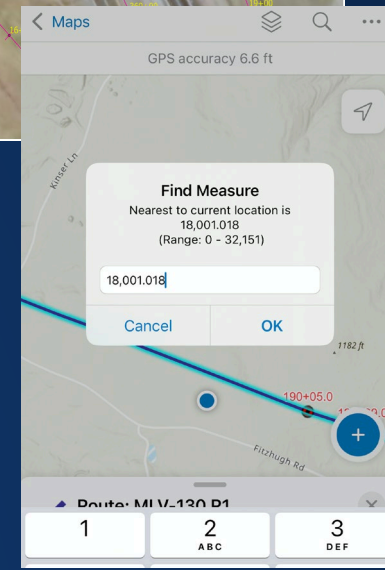
Understanding where you are along a route

- Linear referencing systems

- Highways, railroads, pipelines, utility lines, use a linear referencing system to store relative positions on existing line features.
- Mobile workers need to find measurements along a route, navigate to them and capture route details (measure value) when inspecting assets

- New Find Measure Feature Action

- Find nearest measure value to workers location
- Locate measurement values along route
- Collect at measure location
- Use the Compass to locate measurements along a route
- Get driving directions to the measurement (Navigator, Google Maps, Apple Maps)
- Mark the location as a favorite

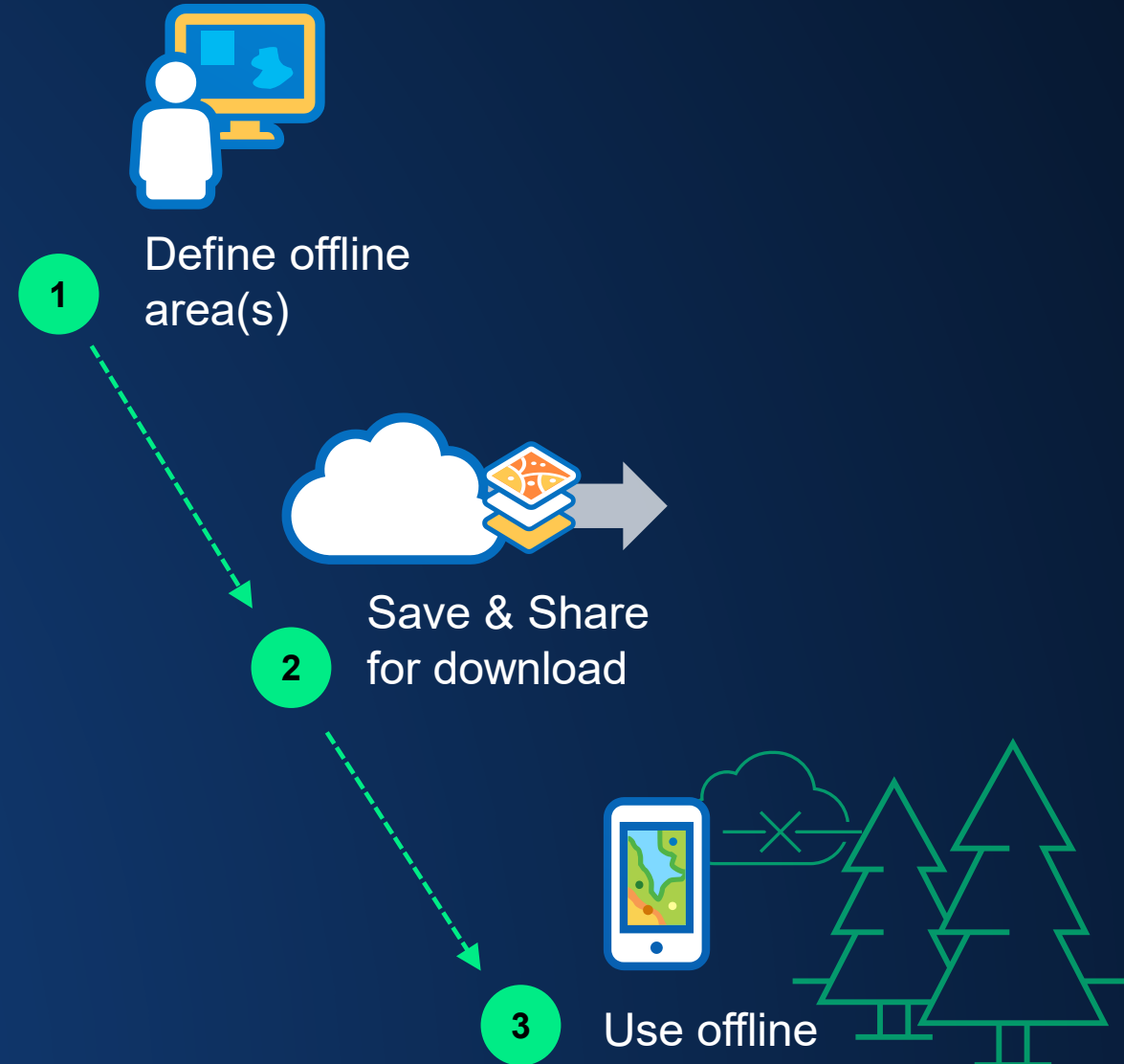


Offline Maps

Don't let lack of connectivity disrupt the work

A consolidated, user-friendly area to prepare maps for offline use in areas with little or not connectivity

- 📍 Enable/Disable Offline mode
- 📍 Diagnose and fix map layer issues
- 📍 Create and manage offline areas
- 📍 Adjust delivery of features and attachments
- 📍 Reference offline basemaps



Field Maps: Capture & Edit Data

Maps enabled for editing

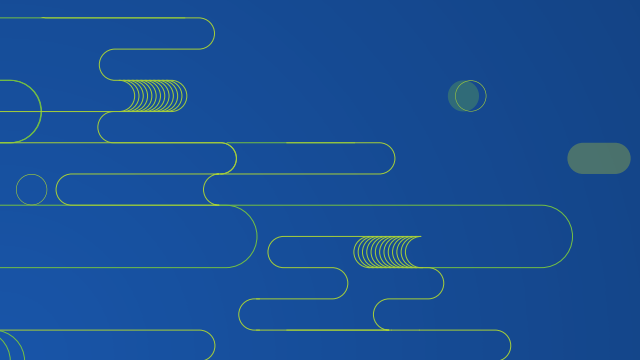
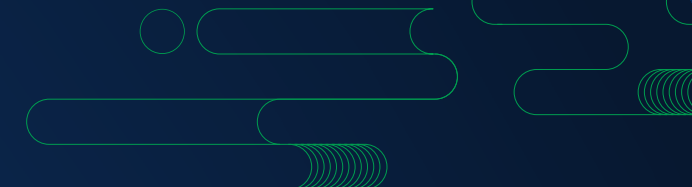
Digitally transform paper-based mobile workflows and maintain accurate asset inventories and inspection records.

- Advanced data collection tools
- Feature layers and tables
- High Accuracy GPS
- Offline



Demo Time

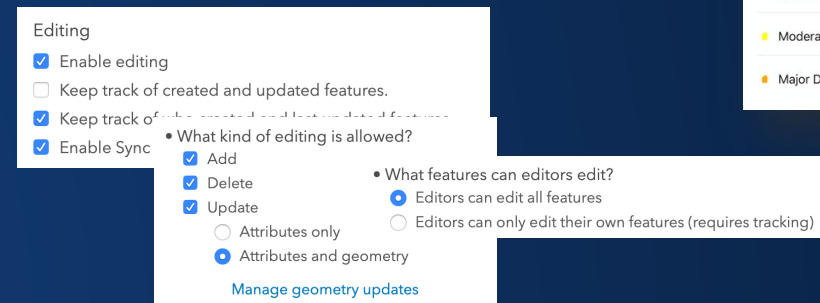
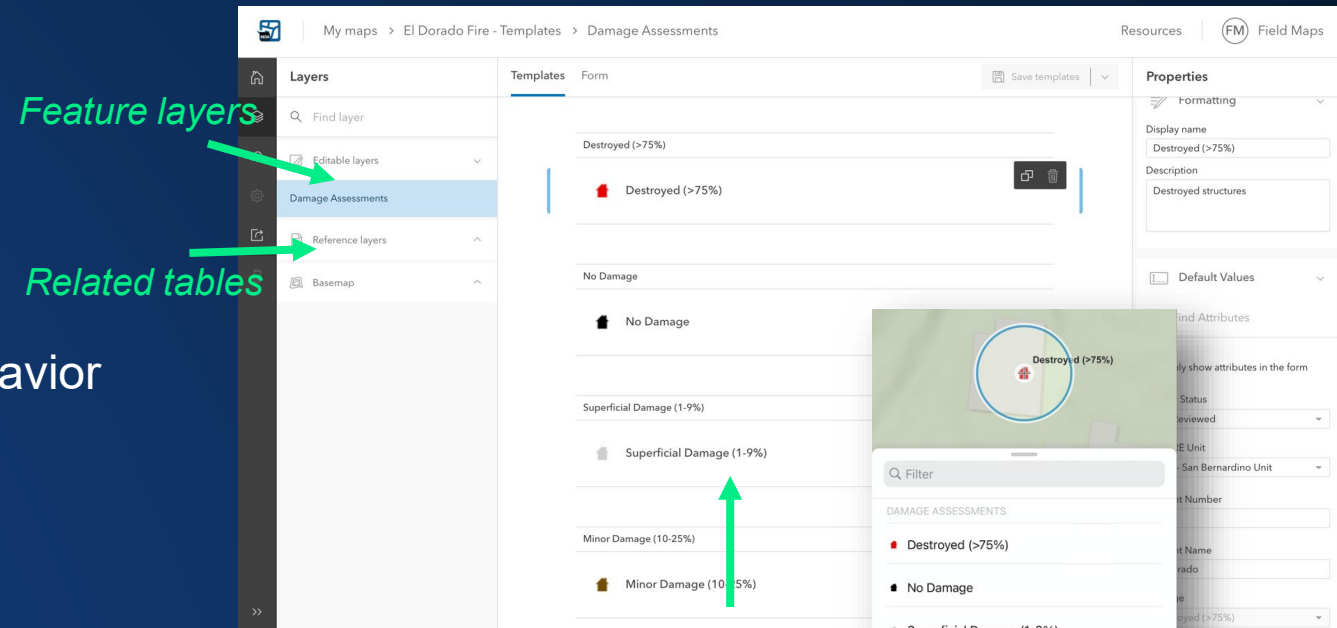
Data Collection demo



Feature Layers

Foundation for smart data collection

- Feature layers drive the editing experience
- Feature layers can include:
 - Layers
 - Tables
- Feature layer editing properties control app behavior
 - What kind of editing is supported
 - What features editors can see
 - What features editors can edit
- Layers have feature templates
 - List of types you can create
 - A symbol, name, description
 - Set of default values for forms
- Feature Layers can have relationships
 - Layer to layer, Layer to Table

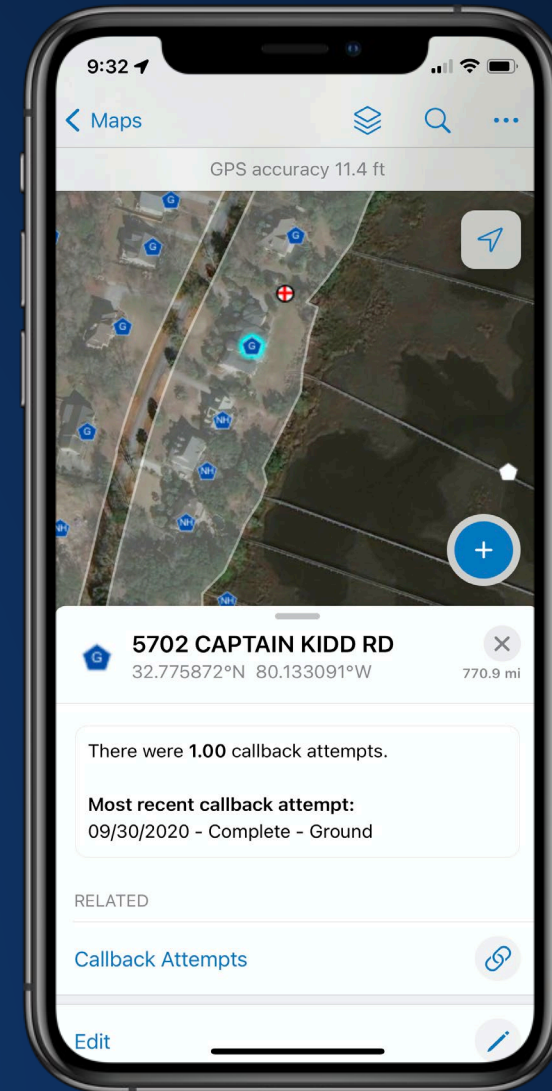


Editing properties

Managing Edits and Data

Digital map-centric records

- Choosing a storage and transaction model
 - Hosted/Non-hosted
 - Non-versioned vs Traditional versioning vs Branch versioning
- Modeling inspection workflows
 - Feature inspections (new feature, update attributes on existing)
 - Historical, tabular inspections (model using 1:M relationships)
- Smart forms supported on layers and tables
 - Focus on what information needs to be captured
 - Provide description information and entry choices
 - *Perform calculations where you can



High Accuracy Data Collection

When precision matters

- GPS accuracy
 - 1 – 3 meters for above ground assets
 - > 1 foot for below ground assets
 - Cm accuracy for construction projects
- GNSS Partner Integrations
 - iOS, Android
 - Extending capabilities
 - Eos Positioning, Bad Elf
 - Trimble, Leica
- Different ergonomic solutions
 - Pole mount
 - Back-pack
 - 3D printed attachments...



Fit for purpose land administration (Colombia)

High Accuracy Data Collection

When precision matters

- GPS Capture capabilities

- Single Point/vertex capture (w/ Z-value)
- Streaming data capture (lines/areas)
- Averaging

- Understanding Accuracy

- GPS bar
- GPS metadata
- Required accuracy
- Confidence level

- Connecting to Receiver

- Location Provider
- Location Profile



High Accuracy GPS Settings

*Required field

Build Smart Forms

For smart data collection

Improve the way you collect and update data in the field with user-friendly map-centric smart forms.

- Platform-wide capability
- Drag & drop design experience
- Multiple input types and field controls
- Advanced capabilities with Arcade

ArcGIS Field Maps | My Maps > Naperville Water | Account Name | account id

Layers | Templates | Form | Save form | Properties

Hydrant Inspections

Inspection Information

Inspector

Inspection Date Time

Hydrant Flush

Flush Required

Pressure (PSI)

Flow Duration

Flow Rate

Hydrant Maintenance Inspection

Paint Required

Lubrication Required

Chains Required

Greased

Properties

Formatting

Conditional visibility

Show input when

matches all conditions

Flush Required

9:41 | Cancel | Collect | Submit

Hydrant Inspection Number:

INSPECTION INFORMATION

HYDRANT FLUSH

Recorded details about flushing.

Flush Required

Yes

Pressure (PSI)

Flow Duration

Flow Rate

HYDRANT MAINTENANCE INSPECTION

Details about the materials used.

Paint Req'd?

Lubrication Req'd?

Chains Req'd?

Greased?



Smart Forms

Key Capabilities

- Descriptive text properties
- Read-only and required fields
- Use groups to organize form
- Various input types
- Various options based on field data type
- Use Arcade or Arcade Expression builder to apply conditional visibility
- Form calculations

Formatting

Display name
Inspector Information

Description
Pick your assigned unit, enter name and date, and add structure details.

Initial state
 Expanded

Conditional Visibility

+ Add expression

Conditional Visibility

Evaluate Damage
expr0

Input type
Switch

Switch values

Non-Compliant

Compliant

Required

Allow editing

Evaluate Damage Edit

Expression

```
1 DomainName($feature, "Damage") != "No Damage"
```

Test

STRUCTURE INFORMATION *

Provide details of the damaged or destroyed structure inspected.

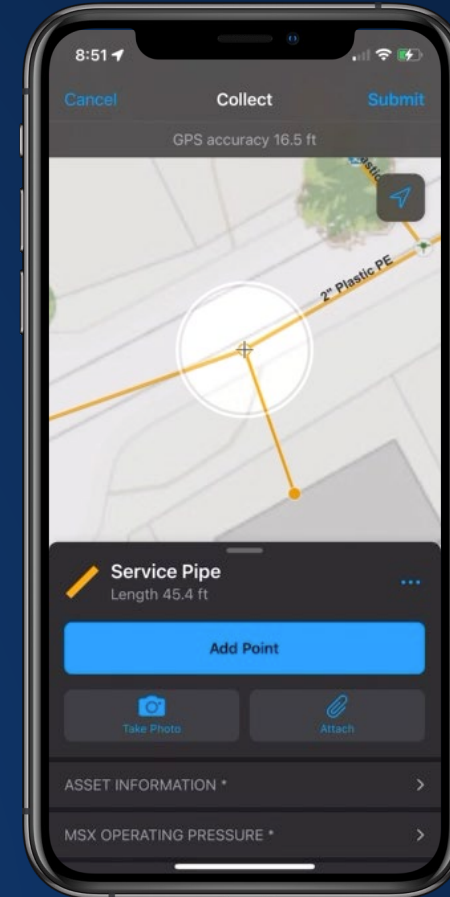
PRC4291 Compliant *

Vegetation Clearance *
60-100 feet

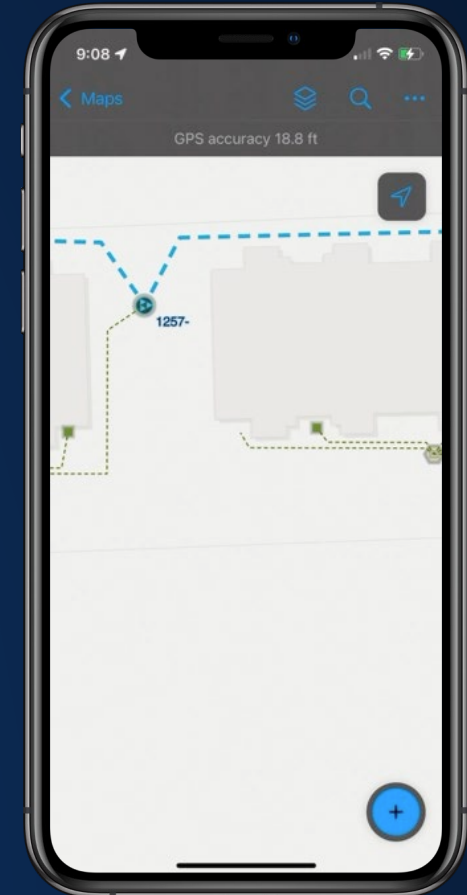
Form Calculations

Increase efficiency and minimize errors

- Provide immediate feedback to mobile worker
- Works online and offline
- Calculations can use:
 - Information already collected in the form
 - Geometry, Attributes
 - Additional layers and tables in the map
 - Portal connection (user information, etc)
- Calculations can control form behavior:
 - Required fields
 - Conditional visibility in forms



Decode barcode



Fields from other layers

Form Calculations

Increase efficiency and minimize errors

- Expressions use the Arcade expression language
- Authored in ArcGIS Field Maps web app
 - Will be available in Map Viewer
- Part of web map specification
- Form editing apps include:
 - ArcGIS Field Maps
 - Map Viewer
 - Experience Builder
 - JSAPI editing widget

The image shows a screenshot of the ArcGIS Field Maps web app interface. On the left, there is a form titled "Address Info" with four input fields: "Street Number", "Street Name", "City", and "Zip Code". On the right, there is a "Properties" panel with sections for "Formatting", "Calculated expressions", and "Conditional visibility". The "Calculated expressions" section is expanded, showing a list of expressions. A context menu is open over the "Street Number" expression, with options for "Duplicate", "Edit", and "Delete". Below the "Street Number" field, there is a "Street Number" label with an "Edit" link. At the bottom, there is a code editor showing an Arcade expression:

```
1 var parcels_FS = Intersects($feature,  
2   FeatureSetByName($map, "Redlands parcels"));  
3  
4 if (Count(parcels_FS) == 1){  
5   return Number(First(parcels_FS).ST_NUM)  
6 }
```

Form Authoring

Continuous focus on new smart form functionality

- Authoring new form elements
 - Basic form elements
 - Choice elements
- Adds fields to existing feature layers as you design your form.
- Contingent value field groups

The image displays a form authoring interface. On the left, a 'List of values: District' table shows 34 values with columns for 'Label' and 'Code'. Below the table, a message indicates that a CSV file named 'building_function.csv' was successfully added. The main area shows a form titled 'Buildings' with fields for 'Building function', 'District', 'Type of structure' (radio buttons), and 'Parking required?' (toggle). On the right, a 'Form builder' panel lists various field types under categories: BASIC (Barcode, Date / Time, Number - Double, Number - Integer, Text - Multiline, Text - Single line), CHOICE (Combo box, Radio buttons, Switch), and LAYOUT (Group). The 'Form builder' panel also includes options for 'Conditional visibility' and 'Calculated expressions'.

Label	Code
Albina Community	AC
CascadeStation/PIC	CP
Central City	CC
Columbia South Shore	SS
Division Street	DV
East Corridor	EC
Eastmoreland	EM
Gateway	GA
Glendoveer	GL
Hayden Island	HI
Johnson Creek Basin	JC

Drag and drop a CSV file or browse your device.
To view this resource format, download the template CSV file.
building_function.csv successfully added

Form builder

Form elements

BASIC

- Barcode
- Date / Time
- Number - Double
Decimal, e.g. 1.2
- Number - Integer
Whole, e.g. 1
- Text - Multiline
- Text - Single line

CHOICE

- Combo box
- Radio buttons
Recommended for up to 5 values
- Switch

LAYOUT

- Group

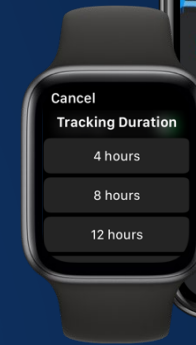
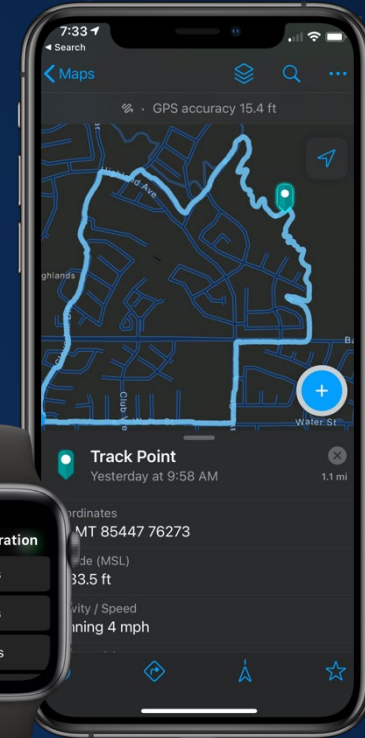
Conditional visibility
Calculated expressions

Field Maps: Location Sharing

Situational awareness in the field and back office

Mobile workers can share their location while on the job to:

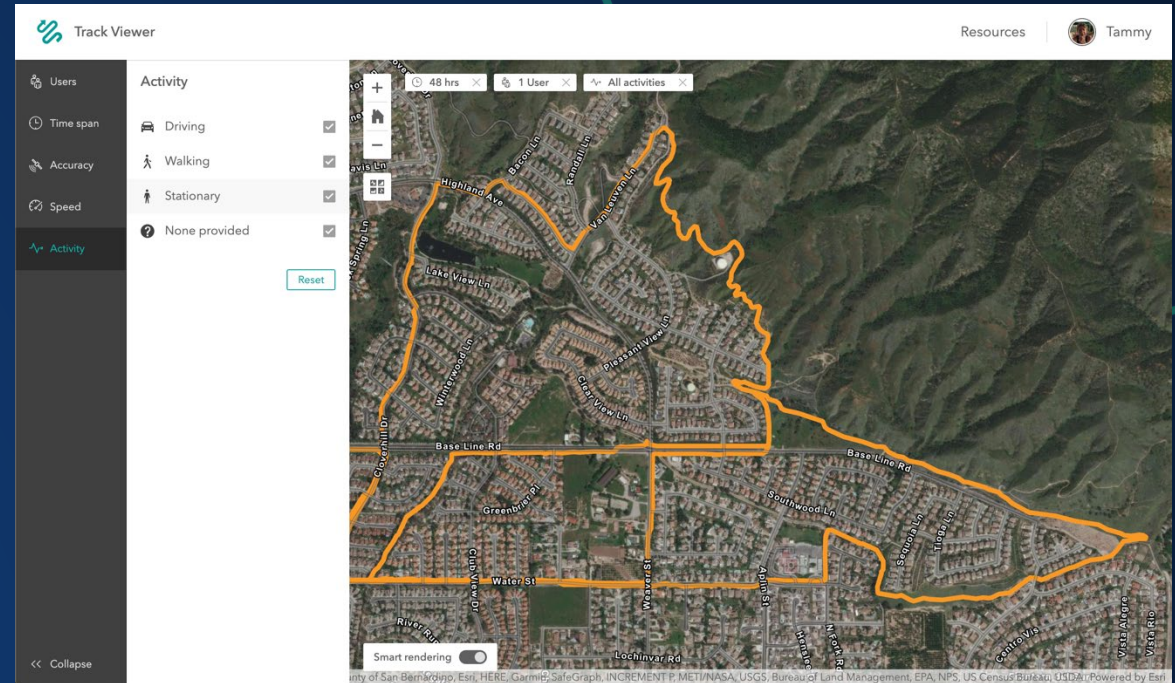
- Coordinate work based on proximity
- Improve emergency response times
- Capture audit trails
- Manage events
- Improve worker safety



Field Maps: Location Sharing

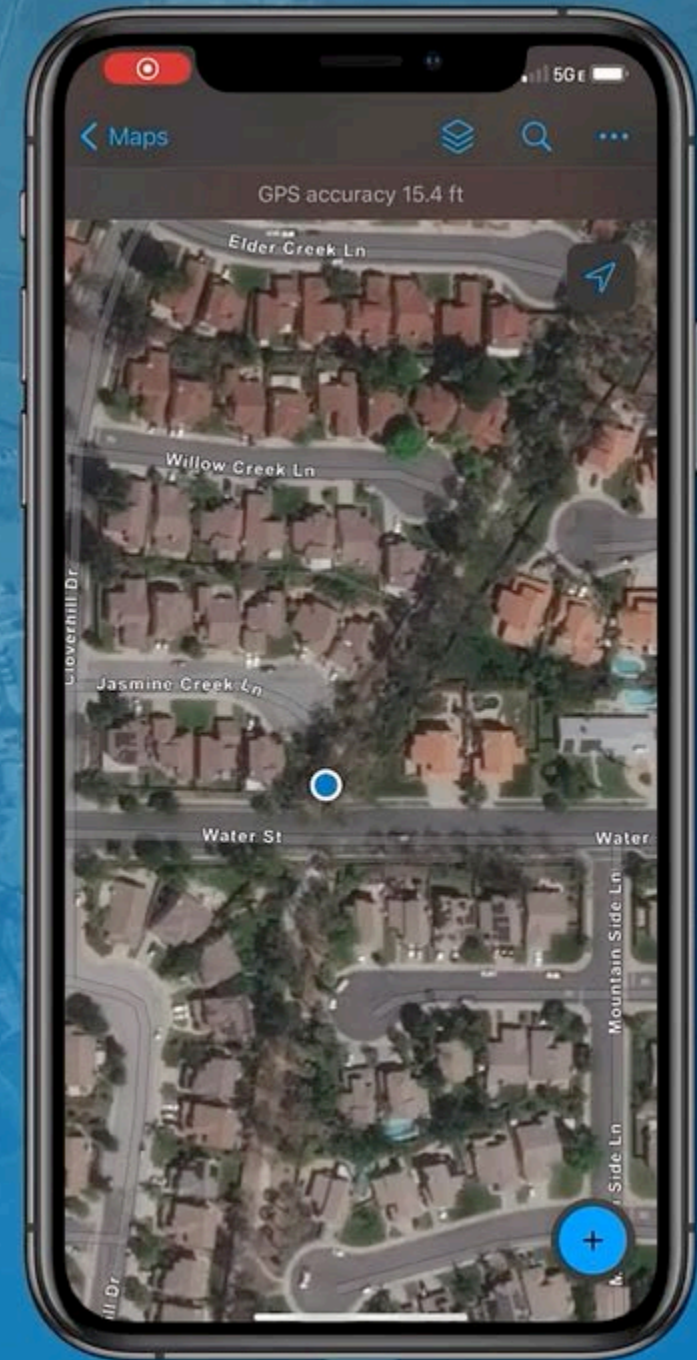
Key capabilities and what's new

- Battery savings optimization options, driven by activity
- Switch location sharing on/off for all maps from maps screen or within a map
 - Track for a duration
- View location tracks in any map (iOS/Android)
 - Turn tracks layer on/off
 - Set location sharing duration
- Start and stop location sharing with Apple Watch
- Use Track Viewer to share location with others
- New Track lines layer for improved viewing
- Supports Viewer user type + ArcGIS Tracker license, included with Field Worker



Field Maps: Location sharing

Background recording



Field Maps: App Linking

Esri Apps and 3rd Party Apps

Esri Specialized Apps

- ArcGIS Survey123
- ArcGIS QuickCapture
- ArcGIS Mission Responder
- ArcGIS Indoors
- ArcGIS Earth
- And more...



3rd party Apps



Custom Apps



app linking

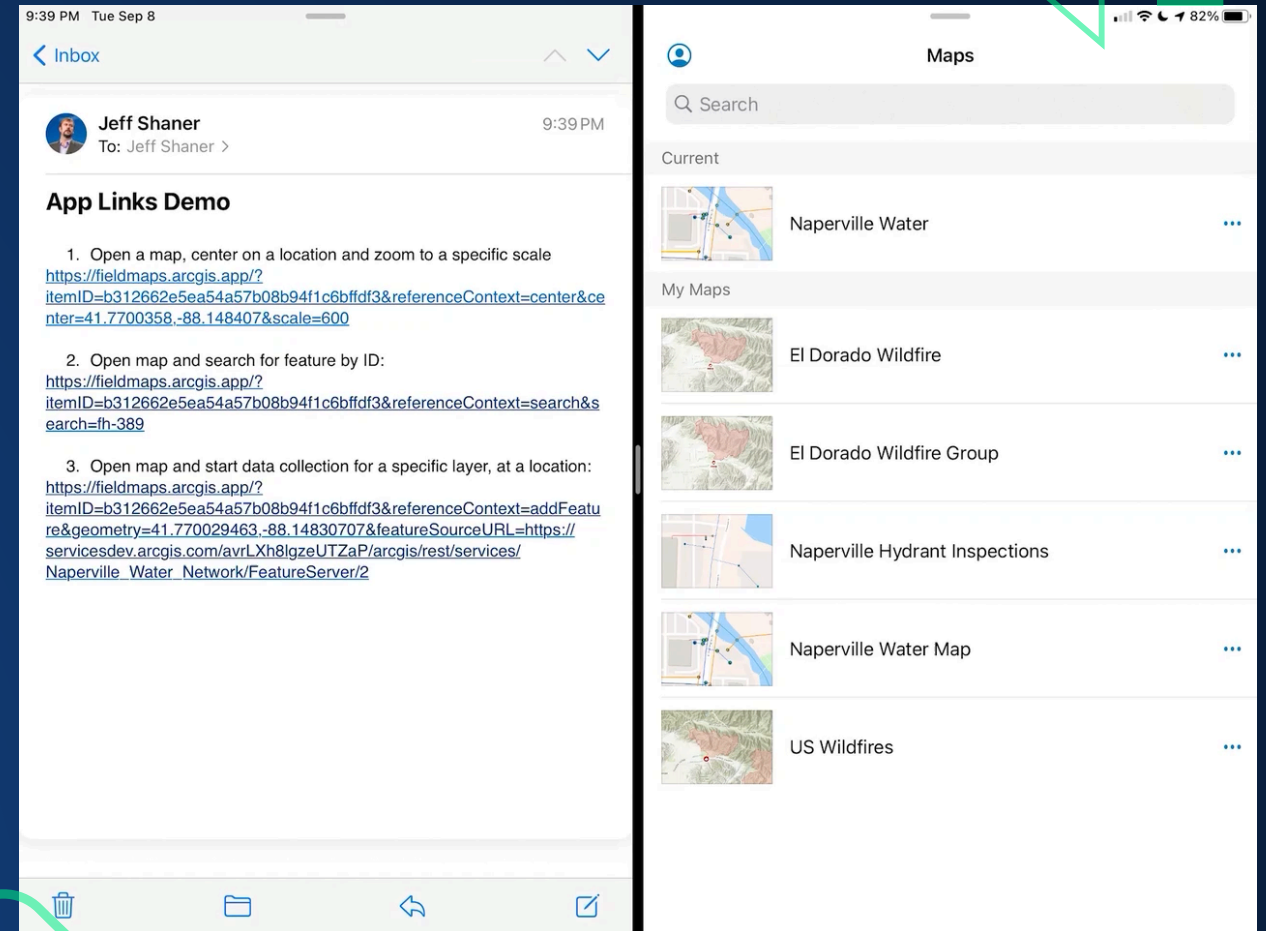


Universal App Links

Integration with Field Maps

Customize your workflows to fit your field operation needs

- Remote control Field Maps
- Define the user's experience
- Send & receive data from other apps



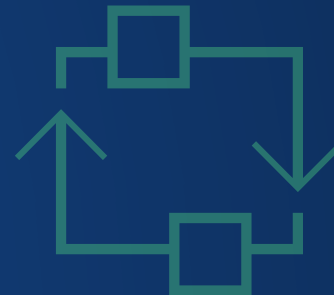
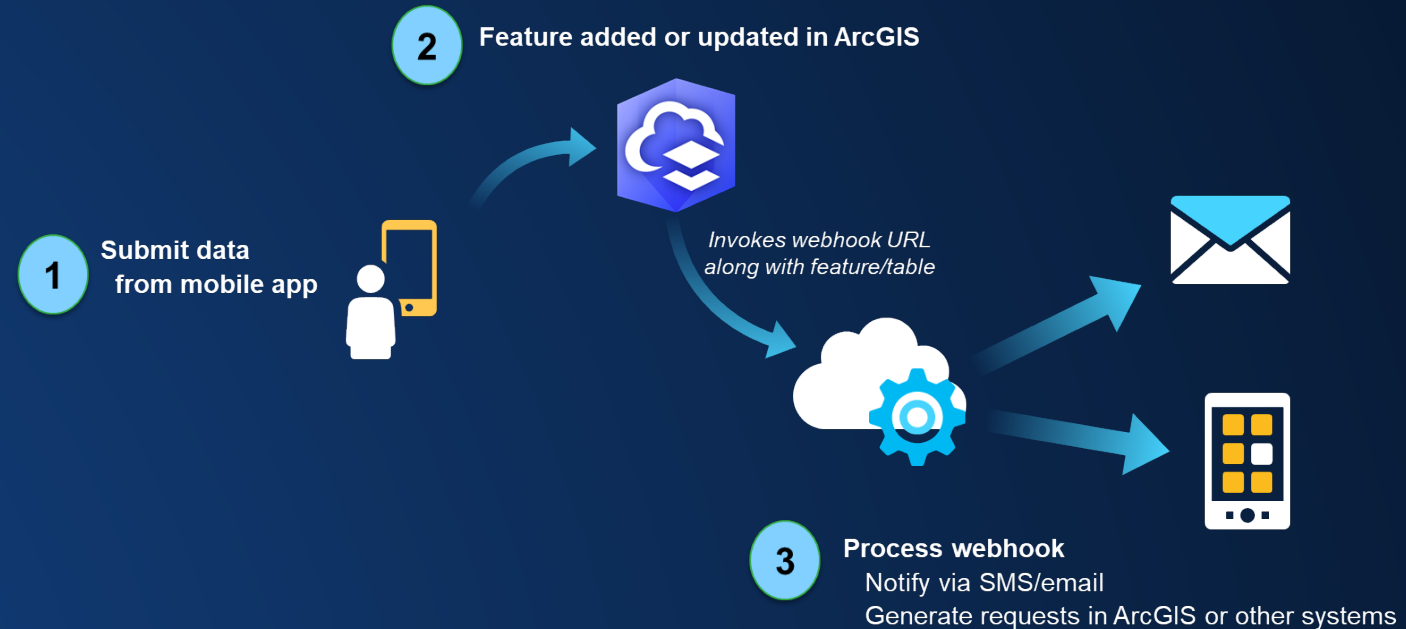
<https://fieldmaps.arcgis.app/>

Field Maps: Web hooks

Automate workflows using Integromat

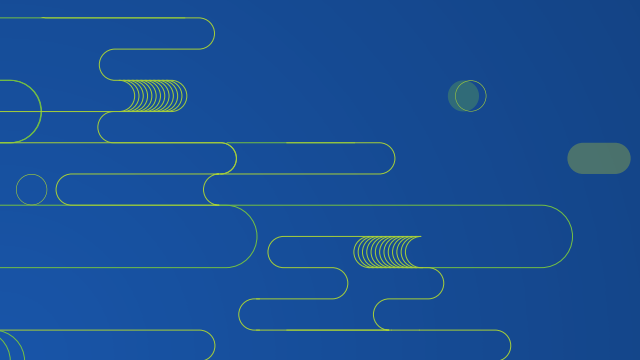
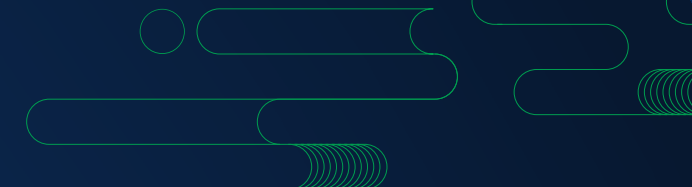
Streamline mobile operations by automating repetitive tasks or triggering important business processes when events happen in the field

- Reduce manual processes & errors
- Integrate with other systems
- Increase productivity



Demo Time

Automating Workflows



Field Maps: Mobile Device Management

MDM slide

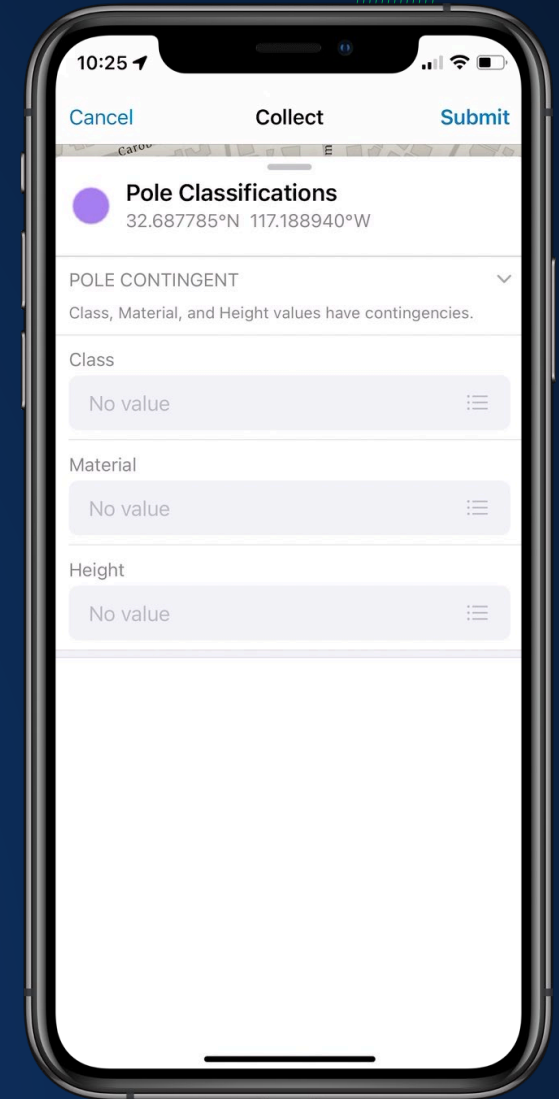
- Follow **AppConfig community** standards
- Community focused on providing tools and best practices to configure and secure mobile apps
 - a set of **standard functionality/parameters**
- Parameters include:



Key	Description
anonymousAccess	Sign in anonymous or use credentials
portalURL	Organizations portal URL
trackingUploadLKLFrequency	Last known location upload frequency
trackingUploadTracksFrequency	Track upload frequency
inAppAuth	Used for sign in and authentication

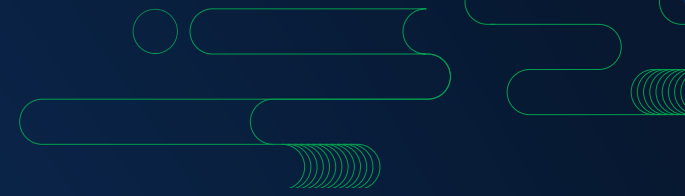
Field Maps: **May 2022 Release**

- Contingent Attribute Values
 - Supports classifications (materials, species, ...)
 - Author and publish using ArcGIS Pro



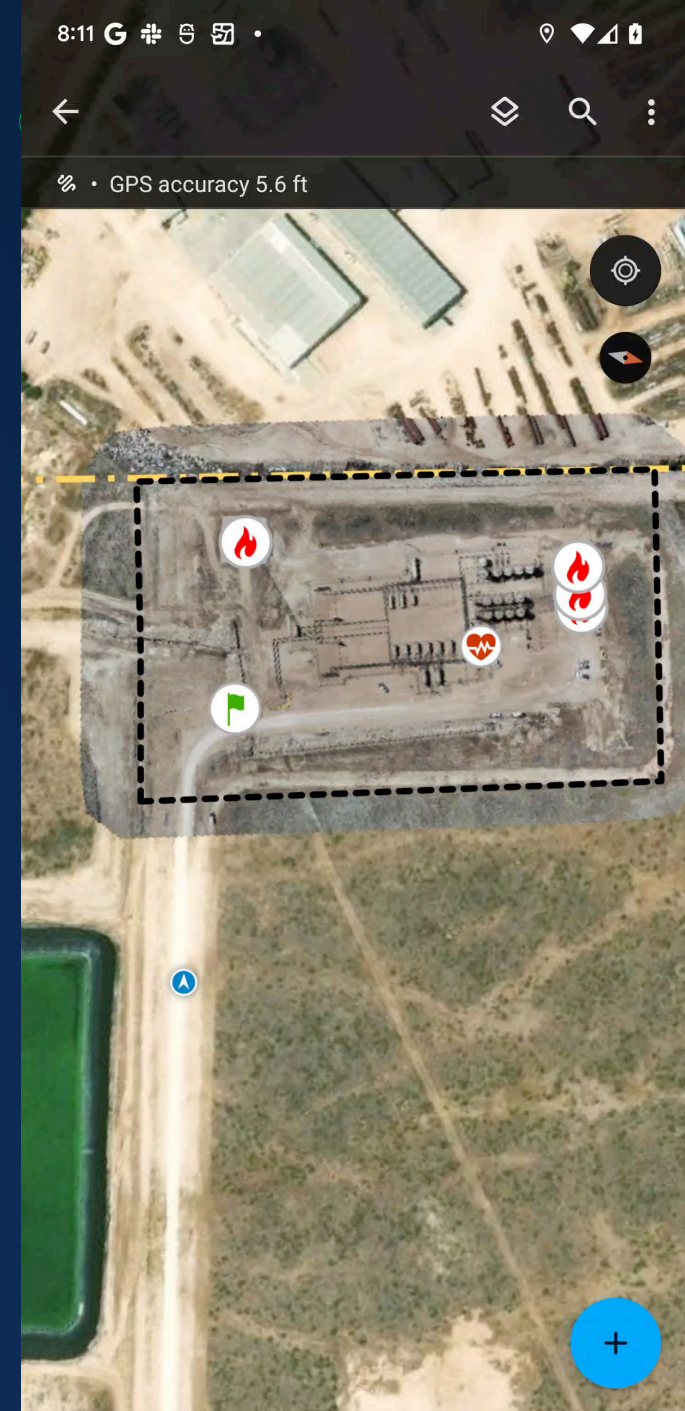
Field Maps

Roadmap



Field Maps: **What's Next**

- Geotriggers
 - Notify mobile workers when they enter or exit a location
 - Switch on/off location tracking when inside/outside an area
- Indoor Positioning and Data Capture
 - Include support for Indoor Positioning
 - Extend floor awareness to support auto-capture of floor information
- Utility Networks
 - Viewing containment, associations and tracing capabilities
- Layer Filtering
 - Dynamic filtering of features within a map layer
- GPS metadata for lines and polygons
 - Average/Worst horizontal and vertical accuracy, worst fix type, number of manual locations captured
- Map Authoring
 - Create maps and layers from scratch using the Field Maps web app



ArcGIS Field Maps Roadmap

Near-term

- Geotriggers
- Indoor Positioning, Indoor Editing
- Layer Filtering
- Creating maps and layers
- Utility Networks
- GPS metadata for lines and polys
- Popup Elements
- Layer Filtering

Mid-term

- **Workforce coordination**
- More Smart Form Capabilities
 - Multi-select, Signatures
- More Data Collection Capabilities
 - Orthometric heights
- Navigation Capabilities

Long-term

- **Camera and Lidar Capabilities**
- More Data Collection Capabilities
- Location tracking configuration
- Push notifications
- Smart watch capabilities

ArcGIS Field Maps releases quarterly, details and timeline subject to change



esri®

THE
SCIENCE
OF
WHERE®