Field Operations

Micah Callough
Technology Director for AEC
Field Operations | Location-enable all phases of field work

Plan
Use location to assign and coordinate field activities

Navigate
Route to your work using your roads, your GIS data – even while offline

Coordinate
Act on real-time conditions in the field to update worker tasks

Understand
See what’s happening around you with maps

Monitor
Know where workers are and see the progress of work in real-time

Capture
Perform data collection and send it back to the office from anywhere
Field Operations | Location-enable all phases of field work

- Plan
  - Workforce for ArcGIS

- Navigate
  - Navigator for ArcGIS

- Capture
  - Collector for ArcGIS
  - Survey123 for ArcGIS
  - ArcGIS QuickCapture
  - Drone2Map

- Coordinate
  - Workforce for ArcGIS
  - Tracker for ArcGIS
  - Explorer for ArcGIS
  - ArcGIS Indoors

- Monitor
  - Tracker for ArcGIS
  - Operations Dashboard*

- Understand
  - Explorer for ArcGIS

*Operations Dashboard is an additional application that provides real-time monitoring and management capabilities.
Serving Public Works

ArcGIS apps help you serve public works organizations:

- Maintain an authoritative inventory of public assets
- Reduce the cost of field operations and maintenance activities
- Improve operational awareness and response to a storm, natural disaster, special event, or an incident
Collecting Critical Infrastructure | Improve Accuracy and Currency

Take Maps to the Field:
• Collect Infrastructure data
• Ground-truth As-Built designs
• Inspect existing asset data
Downtown Washington Street Bridge Replacement Project

Frequently Asked Questions (FAQs)

Why is the bridge being replaced?
The bridge foundation was constructed in 1928, widened in the 1970s and renovated in 2004. The bridge components have reached the end of their effective service life. The bridge has a special weight load limit of 15 tons which prohibits use of the bridge by nearly all trucks. Replacing the bridge also provides the opportunity to improve the existing roadway geometrics, the functionality of the Riverwalk and overall aesthetics.

Is the existing bridge safe to use now?
Yes, the existing bridge is inspected regularly to confirm public safety. However, there is a 15-ton weight limit posted for this bridge in order to reduce damage from heavy loads like trucks.

How will the community be involved?
Input from the community is very important to make this project successful. The City hosted a
Collector for ArcGIS
Accurate data collection made easy

Efficient data collection
Works anywhere, anytime
High accuracy location capture

Capture
Perform data collection and send it back to the office from anywhere
Collector for ArcGIS
Accurate data collection made easy

Q2 2019
- Parity release bringing Collector in line with Collector Classic
- Referenced basemaps, using the Files app, new transformations, more…

Q4 2019
- Snapping
- Bulk Attribute Update
- Parcel Construction
- Locate
- PKI support

Q1 2020
- Introducing support for Smart Forms
- Android support for new generation of Collector
- Simplifying field deployments
- Utility Network support
Improve Project Delivery

Manage project work:
- Invite sub-contractors to your ArcGIS organization
- Organize tasks
- Dispatch work
- Complete site surveys
Workforce for ArcGIS

Plan and coordinate field work

Plan and coordinate field work

Use location awareness to improve efficiency

Receive & manage field assignments
Workforce for ArcGIS

Plan and coordinate field work

Q1 2020 release including:
• Support for offline workflows
• New, improved UX
• Ability to display local tracks from Tracker

V.Next:
• Push notifications
• Pick up work
• Sequencing work
DEMO:
Workforce & Collector
Micah Callough
ArcGIS QuickCapture
Rapid data collection

A “big button” mobile app

Simplest way to capture field observations

At-speed data collection workflows
Synchronized release across all supported platforms
iOS, Android, Windows
Continuous Early Adopter Program /GeoNet
Updates every 3-4 weeks for QuickCapture Designer

<table>
<thead>
<tr>
<th></th>
<th>June</th>
<th>September</th>
<th>… (Before 2020)</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>• Mobile app. English only.</td>
<td>• Designer Beta. English only.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 1.1, 1.2 | • Mobile app all languages. | • Designer All Languages. | • Web mmpks, VTPKs | • Side-by-side view for tablets
|       | • URL scheme | | • Designer Enhancements (UserInputs, ContinuousMode,…) | • Voice capture
|       | | | | • Auto-pilot mode |
DEM0: Quick Capture

Micah Callough
Survey123 for ArcGIS
Location-aware smart forms

Sophisticated smart form capabilities

Simple data collection experience

Web & Native

Capture
Perform data collection and send it back to the office from anywhere
<table>
<thead>
<tr>
<th>Month</th>
<th>Feature Details</th>
</tr>
</thead>
</table>
| September  | • Lines and Polygons  
|            | • Photo Watermarks  
|            | • Feature Reports                                                            |
| … (Before 2020) |  
| 2020       | • Feature Report PDF output                                                   |
| 2020       | • Web Maps, mmpks, VTPKs  
|            | • On-Prem Rest API/Website setup  
|            | • Extensibility framework  
|            | • Project Update Notifications                                                 |

Updates every 8-10 weeks
Synchronized release across all supported platforms
iOS, Android, Windows, Mac, Linux, Web
Continuous Early Adopter Program /GeoNet
Improving Operational Awareness

Monitor Field Work:
- Monitor field operations in real-time
- Create Summary Stakeholder views
Tracker for ArcGIS
Know what happens in the field

Share your location
Know where everyone is
Detect Patterns

Monitor
Know where workers are and see the progress of work in real-time
Tracker for ArcGIS

Key Components

Tracker Mobile app (iOS, Android)
- Simple, schedule-driven tracking experience
- Supports offline use
- Optimized for low battery consumption
- Requires an premium add-on license

Track Viewer Web app
- Display and manage users and their location history
- See only the users that you have access to (Feature Service views, OBAC)

New Organizational Capability
- Enable location tracking in their organization
- Single service for storing and managing location tracks
- Requires the spatiotemporal big data store
ArcGIS in the Field

Critical Infrastructure

ArcGIS Online → Collector

Enabling Project Delivery

Workforce → Survey123 → QuickCapture

Improve Operational Awareness

Operations Dashboard
AutoCAD
Civil3D
InfraWorks
Drone Collections
Drone Collection

Complete drone management solution

Flight Planning

Data Processing

Data Collaboration

Capture
Perform drone based data collection and ensure data fits lifecycle
The Science of Where
Integrates Dynamic Data About Everything
A Comprehensive View of the Imagery Platform

*Seamless integration and analysis of imagery with all spatial data*

Image Analyst Extension

Exploitation & Visualization

Pro

Image Analyst Extension

Analytics

Image Server

Photogrammetry

Excalibur

Visualization

Image Analyst Extension

Analysis

Image Management

Map Production
Drone2Map for ArcGIS
PC Solution for Processing Drone Imagery

- Transforms imagery from drones into geospatial information
- Targeted toward the single-use drone operator
- Annual Subscription
- Limited scalability
- Requires powerful CPU for intensive 3D processing
Advanced Requirements

Flight Management

- Ensure proper collection of imagery for the type of mission
- Project-based
- Uses ArcGIS maps for flight planning

Elastic Processing (Cloud)

- System automatically scales to support workload
- Simplified workflows
- Transparent photogrammetry (System is the photogrammetrist, not the user)
- No system configuration requirements

3D Meshes & Modeling

- Structure from Motion
- DSMs & DTMs
- Creates high density point clouds
- Creates accurate and detailed 3D mesh products

ArcGIS Compatibility

- Integrated with ArcGIS
- Produces results that match Drone2Map
- Shared cloud storage
A Complete UAS Solution

Key:
- Direct connection
- Indirect connection

Step 1) Capture data with UAS and App
Step 2) Process and manage data with Manager or Drone2Map
Step 3) Enhance data workflows using Esri ArcGIS or Autodesk solutions
ArcGIS Drone Collections

**Drone Mapping**
- Drone Mapping
- Collection
- Processing
- Tasking
- Dissemination

- Drone Tasking App
- PC Processing
- Advanced 3D Visualization
- Update Feature Layers
- Web Maps & Dashboards

**Drone Mapping & Analysis**
- Drone Mapping & Analysis
- Collection
- Processing
- Analysis
- Tasking
- Dissemination

- Drone Tasking App
- PC Processing
- Imagery Analysis
- Advanced 3D Modeling
- Update Feature Layers
- Web Maps & Dashboards

**Online Drone Mapping**
- Online Drone Mapping
- Collection
- 3DR
- AGOL
- Tasking
- Dissemination

- Flight Management Software
- Multi-User Configuration
- Unlimited Elastic Processing
- Advanced 3D Visualization
- Update Feature Layers
- Web Maps & Dashboards

**Enterprise Drone Mapping & Analysis**
- Enterprise Drone Mapping & Analysis
- Collection
- 3DR
- Enterprise Server
- Image Server
- Tasking
- Analysis, Exploitation, & Dissemination

- Flight Management Software
- Multi-User Configuration
- Unlimited Elastic Processing
- Robust Image Management
- Raster Analytics & Analysis
- Advanced 3D Modeling
- Update Feature Layers
- Web Maps & Dashboards
Intelligent Flight Modes

Map areas

Area Survey
Most efficient way to map an area. Camera is pointed nadir and the UAS flies in a “lawnmower” pattern.

Crosshatch Survey
Capture an area with vertical features by flying a crosshatch pattern. The camera is pointed at an oblique angle and the UAS flies a pattern that acquires all four sides of any vertical features.

Model objects

Perimeter Scan
Fly around a vertical feature at different elevations. Perfect for 3D modeling or automated inspection.

Vertical Scan
Fly up the vertical (or near vertical) face of a feature such as a dam, bridge, or cliff.

Share updates

Panorama
Create an interactive 360 photo automatically. This photo can be viewed on the iPad or the web browser.

Inspect
Take control of the UAS and capture images and video manually.
The H520-G is a hexacopter that has been developed for commercial use:

- Long flight times: 25 min w/E90 camera
- Built for inspections: six-rotor systems that allow for stable, precise flight
- Exclusive flight speed control offers slowest speed above stall flight for maximum precision in challenging environments
- Landing gear retracts out of the way to give you a full, 360° view
- Hot-swap payload options
- Standard E90 camera provides 4K/2K/HD video or 20Mp still images
- Final assembly in the U.S. under TAA guidelines, and able to meet strict Government standards regarding security
Drone Image Products

2D Image Maps (Ortho Mosaics):
- Map Accurate Image Maps
- Seamless stitched for base mapping
- Digital Surface Models

3D Elevation Products:
- Point Cloud (LAS)
- 3D Mesh Models
- 3D Site Models (PDF)

Oblique Inspection Photos:
- Non-Distorted but Map Accurate
- Can provide basic 3D Measurements
Typical Information Products

**Base Mapping**
- Orthomosaics (.TIFF & .TPK)
- Digital Surface Model (DSM)
- Digital Terrain Models (DTM)
- Contours

**Site Modeling**
- Point Cloud (Imagery derived)
- Scene Layer Package (.SLPK)
- 3D GeoPDF

**Inspect & Measure**
- Annotate Images
- Inspection Viewer
- 3D Measure*
3DR is an Autodesk portfolio company that makes Site Scan—the leading drone data platform for AEC professionals. With Site Scan, you can capture unlimited amounts of data on-site, then quickly process to the cloud on a private, secure platform where you can store, manage, and analyze results within hours and more.
3DR Site Scan Flight Planning

Flight Settings

Altitude: 300ft
Gimbal Angle: 35°
Hatch Angle: 90°
Advanced

Center Flight Path to Map

FLY →

6 min estimated
0.9 in/px resolution
3.07 acres survey area
43 images
1 battery estimated
DEMO: ArcGIS Drone Collection - 3DR Site Scan
Upload Raw Imagery to the Cloud as a Project

The processing system dynamically scales based on workload
Improved 3D Mesh Products for Visualization

System automatically creates and publishes tile cache and scene layer packages for ArcGIS Online
ArcGIS Drone Collection- 3D Mesh
Learn More

- Contact your Account Manager to schedule a demonstration
- Visit: Esri Imagery and Remote Sensing site
- Visit: 3DR Site Scan
  - [https://3dr.com/products/site-scan-platform-2/](https://3dr.com/products/site-scan-platform-2/)
- Imagery Contact:
  - Caroline Tyra, Global Imagery and Remote Sensing
  - ctyra@esri.com