

Digitally Transform Field Operations

Using the Power of Location in Field Operations

Harnessing the Power of Location

Location is at the heart of field activities. It sounds like an obvious statement, but field management often either completely overlooks location or marginally takes advantage of it.

Field managers and workers are likely to make decisions faster and deliver better customer service if they can access location intelligence in the field. This e-book explains how geographic information system (GIS) technology and a suite of field mobility apps work together to improve performance in the field. Five case studies show how organizations incorporated apps into workflows and describe the returns they gained.

Organizations use GIS to capture, manage, analyze, and display all forms of geographically referenced information and use focused field apps to improve field operations. Its ability to transform data into useful information has proved to be highly valuable to field operations managers in four operational areas: coordination, navigation, data collection, and monitoring.





Field Operational Areas

Coordination for exceptional customer care

Daily operations need to quickly adjust to changing conditions including last-minute requests and unexpected resource unavailability and delays. A geographic perspective allows you to easily see the location of the worker nearest the call and quickly assign that worker to respond. This level of flexibility results in exceptional customer service and compliance with service-level agreements.

Workforce for ArcGIS helps you quickly put resources where they are most needed.

Navigation for timely service

GIS does much more than map point A to point B. For instance, users can add other layers of information, such as private road networks and asset locations, to street maps. GIS apps combine this data and calculate optimized routes that fieldworkers see on their mobile devices, even when disconnected. GIS recalculates delivery windows in real time based on traffic conditions, so drivers can give an estimated time of arrival (ETA), which keeps customers happy. GIS is the route optimization tool of choice for organizations whose reputation and success are defined by on-time delivery.

Navigator for ArcGIS, StreetMap Premium for ArcGIS, and ArcGIS Network Analyst support routing with high-quality street data and give you tools for complex problem solving.

Data collection for accurate information

Built-in GIS capabilities in mobile apps ensure that location information is included in the data. This capability extends to other business data submitted via inspections, incident reports, or any type of form entered into your system of record. Understanding the location where field activities happen is critical for historical analysis, QA/QC, regulatory compliance, and coordination with other users.

Focused apps allow crews to capture, update, and analyze data accurately. Fieldworkers use these apps to create surveys, capture the answers, and analyze the results. Mobile apps provide fieldworkers with their organization's maps, allowing them to locate assets and mark up the map with additional details. Drones offer an inexpensive way to capture field imagery, and by using a desktop app, drone-captured imagery can be easily turned into professional quality imagery products that you can use for mapping and analysis. Data generated by these apps can all be synced at the office and shared within the organization and the public.

Collector for ArcGIS, Explorer for ArcGIS, Survey123 for ArcGIS, and Drone2Map for ArcGIS boost data accuracy and optimize geospatial analysis.

Monitoring for fast analysis and response

It is difficult to manage what you cannot see. GIS provides dashboards that enable real-time monitoring of events and key performance indicators (KPIs) so that you can make decisions at a glance. GIS-based dashboards show information as maps, charts, gauges, and other understandable visualizations. Combined with real-time GIS analysis, GIS dashboards help organizations focus on specific information by revealing exceptions, trends, and patterns that are relevant for decision-making.

GIS also supports tracking of field personnel. Managers and supervisors are able to view where workers are and where they have been through a mobile app that captures their location tracks. This helps them identify workers' last known locations, confirm the

territory covered, and more effectively balance the allocation of workers to needs.

Operations Dashboard for ArcGIS helps users visualize and monitor data that is relevant to them. Tracker for ArcGIS enables monitoring of personnel to better manage what happens in the field activities.

Apps That Coordinate Fieldwork

TPC Scottsdale is a renowned golf course in Scottsdale, Arizona, that hosts the Professional Golf Association (PGA) Tour's annual Waste Management Phoenix Open (WMPO). During the week of WMPO festivities, the city's population nearly triples, challenging the Scottsdale Fire Department (SFD) to meet the temporary increase in demand for medical response.

The Challenge

Before the WMPO event, the TPC Scottsdale golf course is transformed by the addition of temporary massive structures across its landscape. The absence of a single source of reliable documentation about the as-built environment left situational awareness and response dependent on disparate maps and PDF files. SFD deputy chief Robert Rucker sought a better solution to manage the 2019 event.

The Solution

An authoritative and comprehensive digital map of the event grounds was created to improve situational awareness using a complete mapping and analytics platform. Over 500 corporate venues were added to the existing digital basemap of the event site.

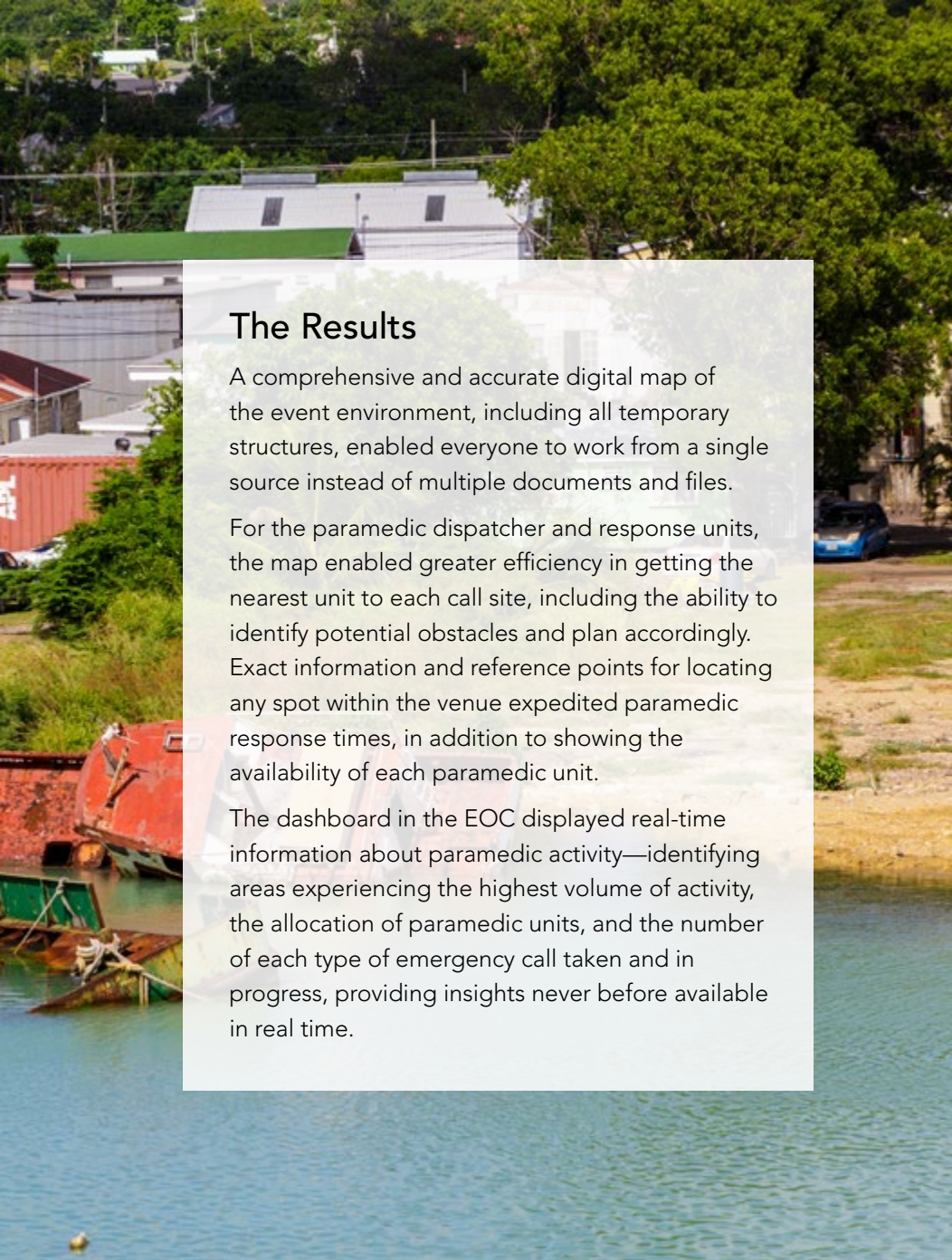
Next, using a survey-based data collection app for creating surveys and analyzing results, precise location data was collected for the newly added structures and assets (such as concessions,

restrooms, and scoreboards) and fed directly into the mapping software. The location of the assets already on the map was verified using the app and corrected as needed.

The map, uploaded to the workforce project planning app, was used to plan where to strategically position the three types of paramedic units—walking, bike, and cart. When a call for medical response was received, the dispatcher was able to identify and dispatch the closest available unit based on the incident type.

Paramedic units had the same digital map in the work assignment mobile app that was on their iPads to respond to assigned calls. An accurate map of the environment enabled them to better identify where help was needed and to efficiently reach each location. The app also was used to report their real-time status—busy, on break, or available—to keep the dispatcher informed of their availability to receive assignments.

At the Scottsdale Emergency Operations Center (EOC), a comprehensive view of the paramedic units was displayed in a real-time dashboard on a large monitor and used by local agency executives to manage situational awareness for the tournament.



The Results

A comprehensive and accurate digital map of the event environment, including all temporary structures, enabled everyone to work from a single source instead of multiple documents and files.

For the paramedic dispatcher and response units, the map enabled greater efficiency in getting the nearest unit to each call site, including the ability to identify potential obstacles and plan accordingly. Exact information and reference points for locating any spot within the venue expedited paramedic response times, in addition to showing the availability of each paramedic unit.

The dashboard in the EOC displayed real-time information about paramedic activity—identifying areas experiencing the highest volume of activity, the allocation of paramedic units, and the number of each type of emergency call taken and in progress, providing insights never before available in real time.

“Safety of my EMT crews was the number one benefit. Next was the ability to allocate the appropriate resources, sending the nearest crew to a call, and finally, the ability to see in real-time where my crews were located.”

Andy McDonald
Scottsdale Fire Department Battalion Chief

Apps That Navigate Success

Pima County, Arizona's Green Building manager, Rich Franz-Under, shares how the county annually saves \$197,000 by using mobility apps that improve efficiencies while improving customer satisfaction. Here is his story:

Every morning, six inspectors leave their homes in Pima County, Arizona, to visit anywhere between five and sixteen houses or buildings. Before they go, each inspector downloads a route that's been strategically designed to account for the time it will take to drive to the site and perform the inspection.

Most mapping software has two different fundamental problems. First, data is not current. Our inspectors work in brand-new housing divisions. Without our custom map layers, we can't route them to those areas. Second, sometimes mapping software has an address different from the official address, and it may send us to the wrong place. The county has the official address data we use for our records. The navigation app uses our custom data. Before, we would have to convert addresses to latitude and longitude and then upload multiple stops. That took up a lot of time every morning. Now, with one click, inspectors see their routes and are ready to go.

We analyzed the time our staff spend performing inspections so that we can determine ETAs for our clients. Previously we spent about four staff hours every day answering the question, "When is my inspector going to be here?" The Navigator app calculates inspectors' ETAs, which we can send via email to homeowners the afternoon prior to the inspection. Homeowners will be able to better manage their time because they will have up-to-date information. Furthermore, we use location information to create routes that better balance workloads and then push those routes to the Navigator app. Now, inspectors travel an average of 34 percent fewer miles each day and decrease drive time by about 18 percent. And we are saving \$197,000 per year on vehicle mileage and inspector's time.

Much of Pima County is rural and has areas without cell service. Inspectors need to be able to receive routing and directions in these areas. The tool they use in the permitting system is offline. Mobility apps that work offline instantly come online in connected areas and, once again, sync with other systems. That is huge for us.



Apps That Empower Employees with Data

Deploying field apps has streamlined asset inspection workflows for a rural electric power cooperative.

Central Electric Power Cooperative (CEPC) provides electric transmission services across 22,000 square miles of central Missouri. Over the 70 years it has been operating, the utility has amassed volumes of paper maps and asset data forms to document its electrical system.

The Challenge

For CEPC's system to run smoothly, the utility must perform annual inspections, maintenance, and service of all its poles, rights-of-way, and equipment. But office staff and linemen in the field were often working with inaccurate system maps and data in multiple formats that were difficult to use and slowed fieldwork and services. As a result, CEPC experienced significant inefficiencies in managing and servicing its network and, therefore, wanted to change the situation. They needed a solution that would provide an accurate system map and data and that would work in connected or disconnected environments.

The Solution

CEPC realized that a GIS mobility suite could provide access to the same data whether fieldworkers were

working in a connected or disconnected environment. CEPC deployed a solution that met its specific needs. To begin, staff built an accurate basemap of the entire service area. Staff also converted the co-op's high-resolution imagery into map tile packages that could be used via the web. They could side load the map tiles onto mobile devices so that workers could use them when working offline.

The mobility app suite helped CEPC replace its paper-based data collection system with digital data collection that improved data capture tasks and data quality and made the data available to more users. The GIS also converted digital data to feature layers for mapping. Using a survey app, staff created a smart form to help fieldworkers record asset inspections on their mobile devices. The data would instantly stream to the GIS platform. In addition, the co-op deployed the mobility suite's navigator app to improve drive-times and services. The app accessed the service area data and routed fieldworkers from asset to asset across the CEPC road network.

With the promise of these apps seamlessly working together, CEPC staff ran a three-month test. The results convinced them to move forward with full deployment of the field mobility app suite.

The Results

To train all staff members to use web apps, CEPC created a detailed user manual and conducted a training session for the entire field workforce. Office staff walked linemen through various scenarios while they followed along on their company-issued iPads. Then, the linemen took the new app workflows into the field using the navigation app to get to their assignments. They easily collected and edited data on-site by using the collector and survey apps. Their feedback was positive. For the first time, linemen had all the information they needed at their fingertips. They completed their daily work assignments without calling the office for additional asset details or referring to paper maps.



“The crew found that ArcGIS apps were easy to use and made work more efficient.”

Andy Adrian, CEPC Right-of-Way Coordinator

Apps That Monitor Operations

Gulfport Energy Modernizes Workflows

The Challenge

Gulfport Energy is an independent oil and natural gas exploration and production company, headquartered in Oklahoma City, Oklahoma. To best serve its shareholders, the company uses technology that reduces costs. For identifying suitable pad site locations as well as locating rights-of-way for aboveground water pipelines, Gulfport Energy had relied on third-party data collection services and applications, which were costly. Also, these came in paper forms, which made them difficult to share and led to inaccuracies. Gulfport also sought a mobile in-house workflow for the inspection of sump pumps across nearly 270 well pad sites. Gulfport Energy puts GIS technology at the core of many critical activities and operations that it conducts in the office and the field. The company sought a solution that was part of its existing GIS.

The Solution

Gulfport Energy used the data collector app to identify suitable pad site locations as well as locate rights-of-way for aboveground water pipelines. The IT team chose the data collector app because it has

a mapcentric workflow, and field crews can easily use it. To select the most suitable pad site locations, Gulfport Energy uses GIS to view and assess their potential. The collector app helped to eliminate costly return trips to the office to verify the results of the analysis. In the office, staff used the collector app to plan waterline routes. In the field, they used it to help secure rights-of-way. Gulfport Energy now has more accurate data and has gained efficiencies in field workflows. GIS generates up-to-date pad site and rights-of-way maps that staff easily view and share across departments.

Because the collector app was so successful, Gulfport Energy deployed other apps included in the mobility suite. It used the survey app to create a workflow for inspecting sump pumps across nearly 270 well pad sites. Gulfport Energy reclaims storm water to augment the water supply it uses for drilling, which decreases water disposal costs. To meet water quality mandates and monitor and report water quality at each site, it used the formcentric survey app to capture water quality data. Managers edited the app's questionnaire so that it would be relevant to different phases of operations at various sites.



“Without the use of this GIS technology, [we would not have] the realization of a first-year cost reduction of at least \$2 million.”

*Mark James
GIS Manager, Gulfport Energy*

The Results

The survey app proved a smart and efficient way to evaluate water quality and ensure regulations compliance. Gulfport Energy workers used the app on smartphones, tablets, and laptops to collect the data needed to assess water quality in the field. The survey app works on the secure GIS platform that provides multiplatform device support and seamless data transfer. The platform delivers real-time data from the field to corporate stakeholders. The company's GIS team customized the survey app's questionnaire and added built-in logic so that it would show additional questions depending on the answer given. The app reveals usability features, such as prompts and visual cues, to ensure accuracy. Fieldworkers now use smartphones rather than paper-based forms. Doing so makes data collection accurate and consistent from one worker to the next and reduces the risk of survey data being lost.





Apps to Monitor Personnel

Historic Annual Parade Uses Modernized Situational Awareness

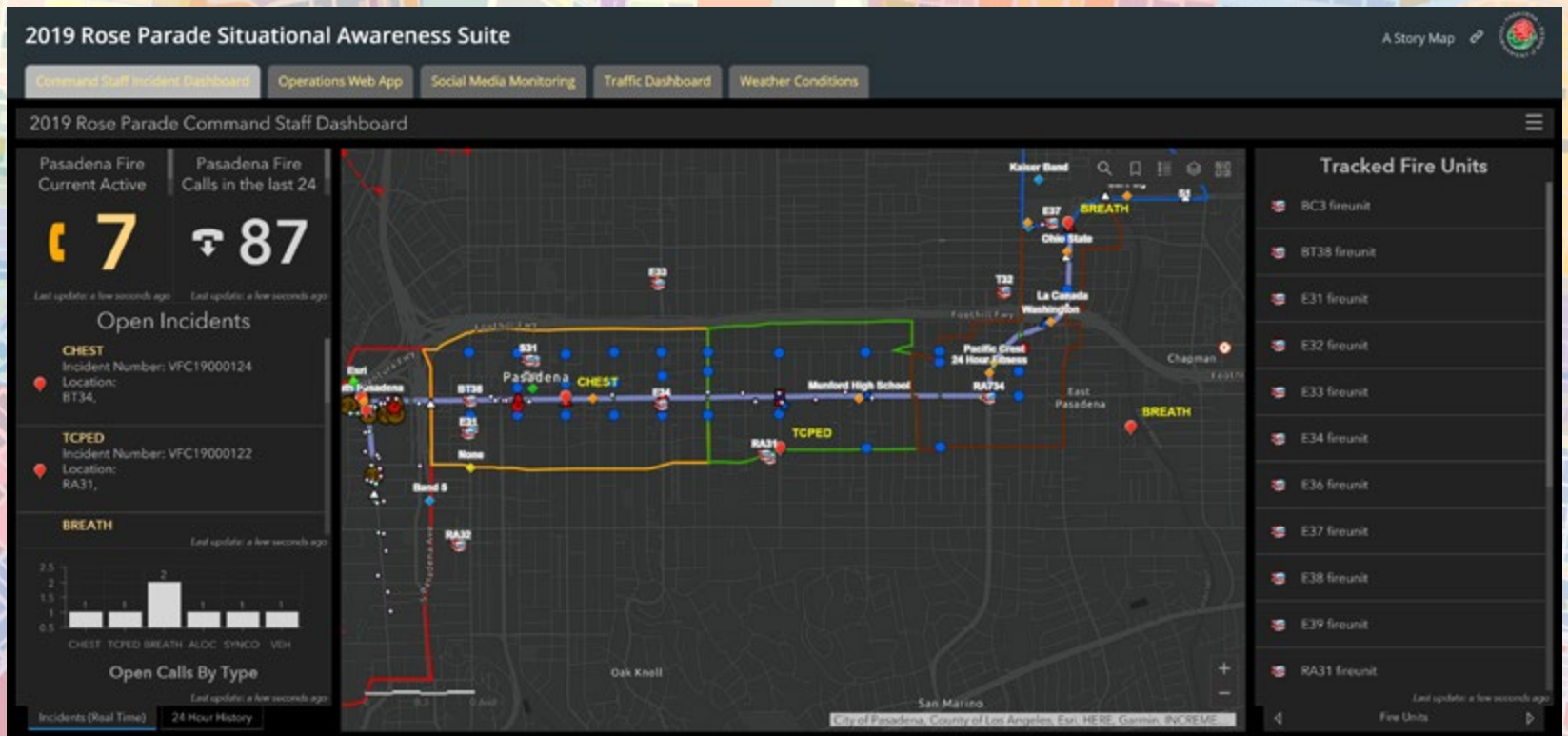
The Challenge

The Pasadena Fire Department (PFD) supports the annual Tournament of Roses (TOR) Parade and Rose Bowl Game in Pasadena, California. For the events, an influx of visitors expands the city's population from 142,250 to over 800,000. Accommodating the parade route and viewers requires many road closures and significant alterations to the typical street network, which makes it a challenging landscape to navigate, even for those familiar with the area.

For 2019, PFD sought to transform its situational awareness and emergency response by replacing bulky map books with an accurate and comprehensive digital map of the event environment and surrounding areas. PFD also wanted the ability to see where emergency response units were in real time to more effectively dispatch them to incident calls at the event.

The Solution

PFD Captain Oscar Sepulveda III applied his ArcGIS Pro skills to create new layers of event-specific details from AutoCAD-rendered maps provided by the TOR Association. Using the drone app, drone-captured imagery of the parade-ready environment was created then used as web map overlays, providing details of the as-built parade environment. With the collector app, accurate location data was collected for assets of interest such as grandstands, emergency response vehicles, and the zones to which PFD responders were assigned. The tracker app was used to capture the location tracks of responders in real-time. In the multi-agency command center, an ArcGIS dashboard displayed the authoritative digital map with the real time location of PFD responders.



The Results

Collaboration between the more than 19 federal, state, and local agencies that support the TOR event was better coordinated with the availability of a single, authoritative digital map. The ability to turn layers on and off based on their relevance to each situation facilitated greater insight into responding effectively to calls. Dispatchers were able to identify the unit nearest a call, and

responders got to their dispatched calls more efficiently, aided by the digital map that identified the quickest routes. The PFD conducted a postincident analysis of the events and concluded that using the Esri ArcGIS platform contributed to the success of the strategic and tactical objectives associated with the 2019 TOR events, and it will be carried forward to 2020.

Realizing Optimized Field Operations

A GIS enables the virtuous cycle of efficiency in field activities. Organizations use field operations apps to plan fieldwork based on geography and better coordinate job assignments. Field operations apps connect workers and activities in the field with the office. Real-time navigation tools reduce fuel consumption, save time, and improve customer satisfaction. Data collection apps capture accurate data in the field and feed it into the GIS to become part of the system of record. GIS monitors field activities and generates intuitive maps and dashboards. The GIS suite of focused field operations apps drives location intelligence that helps organizations make faster and better decisions.

Get more information:

esri.com/fieldoperations





THE SCIENCE OF WHERE®

Visit us at esri.com

Copyright © 2019 Esri. All rights reserved. Esri, the Esri globe logo, ArcGIS, StreetMap, Network Analyst, Drone2Map, The Science of Where, and esri.com are trademarks, service marks, or registered marks of Esri in the United States, the European Community, or certain other jurisdictions. Other companies and products or services mentioned herein may be trademarks, service marks, or registered marks of their respective mark owners

G666100