Digitally Transform Field Operations

Using the Power of Location in Field Operations

esri UK

THE SCIENCE OF WHERE

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 organisations incorporated apps into workflows and describe the returns they gained.

Organisations use GIS to capture, manage, analyse, 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 optimised 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 optimisation tool of choice for organisations 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 analye data accurately. Fieldworkers use these apps to create surveys, capture the answers, and analyse the results. Mobile apps provide fieldworkers with their organisation'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 organisation and the public.

Collector for ArcGIS, Explorer for ArcGIS, Survey123 for ArcGIS, and Drone2Map for ArcGIS boost data accuracy and optimise 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 visualisations. Combined with real-time GIS analysis, GIS dashboards help organisations 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 visualise and monitor data that is relevant to them. Tracker for ArcGIS enables monitoring of personnel to better manage what happens in the field activities.

Containing the spread of a deadly plant disease

Amid concerns about the possible emergence of a deadly new plant disease, Fera Science has created an ArcGIS app and dashboard to enable hoticulturalists to coordinate thousands of plant and tree inspections nationwide.

The Challenge

One of the most damaging plant bacteria ever identified is spreading in countries around the world. Called xylella fastidiosa (Xf), it has been detected in France, Spain, Italy and Portugal and, if it were to gain a foothold in the UK, it could affect dozens of plant species, including elm, plane and oak trees.

The Solution

Working with APHA, Fera Science has used Esri's ArcGIS platform to develop a complete end-to-end solution to support plant inspections, including testing plant samples and tracing of the spread of the disease.

When a first case of Xf is detected in the UK, a geoprocessing model, developed using Esri's ModelBuilder, will create the initial inspection zone around the plant, divided into 100 metre and 1 km grid squares. Inspectors will then use an intuitive app, created with Esri's Collector for ArcGIS, to view interactive maps of their assigned inspection grids, on their mobile devices, and inspect up to 50 host plants in each square. They will collect a sample from each plant, put the sample into a bag with a barcode and use the Collector app to record the barcode, together with the location of the plant, plant health observations and pictures.

When laboratories test the samples, the results will be recorded against the barcodes and uploaded via a web portal to ArcGIS. Python scripts, developed by Esri UK's Professional Services team, will combine the test results with the data collected in the field and categorise each plant as either diseased, free of disease or inconclusive test. All the data will then be visible on an Esri Operations Dashboard, enabling APHA, DEFRA and other key stakeholders to view the locations and health of each inspected plant in near real time. Whenever a new positive result is recorded, the surrounding inspection zones will be automatically created, allowing inspectors to start collecting new samples straight away.

The Benefits

Real-time data to trace the spread of disease

If Xf is detected in the UK, APHA will be able to see near real-time data on diseased plants and their locations, all around the UK. The ArcGIS dashboard presents the data in a spatial, map-based format that is simple to understand at a glance, enabling people to trace the spread of the disease very easily. Users can see which grid squares have been inspected, monitor the progress of inspections and identify where best to allocate resources based on the latest test results.

Effective collaboration of many stakeholders

The ArcGIS solution can be used by multiple stakeholders, not just APHA. Therefore, in the case of a major outbreak of Xf, inspectors from other organisations and landowners, such as the Forestry Commission, could use the Collector app on their own mobile devices to collect standardised data and samples in a coordinated approach. Other organisations can also be given access to the same Esri dashboard enabling them to collaborate more effectively with APHA and implement joined-up strategies to detect and eventually eradicate the disease from the UK completely.

" The ArcGIS solution can support hundreds of inspectors doing thousands of plant inspections each week. "

Lee Butler, GIS Specialist, Fera Science

Saving lives in humanitarian disasters worldwide

Working at the scene of some of the world's most devastating humanitarian disasters, this volunteer-driven charity uses Esri's ArcGIS to produce up-to-date maps for humanitarian aid organisations. Its new Kiosk product makes vitally important location-based intelligence available to aid workers in digital formats, helping them to respond more quickly and, ultimately, help save more lives.

The Challenge

FSince its inception in 2002, MapAction has become an indispensable part of the global response to humanitarian crises. As soon as its volunteer teams, who are specially trained in disaster response, arrive in affected areas, their services are in high demand from multiple organisations. Consequently, on-the-ground teams face growing pressure to produce and distribute more maps, more quickly.

The Solution

Esri UK has supported the work of MapAction for over twelve years, and ArcGIS, Esri's geographic information system (GIS) platform, plays a pivotal role in the delivery of MapAction's emergency mapping service. MapAction secured funding for a new 'selfservice' mapping facility, and sought out the expertise of Esri UK's professional services team to help it design and deliver this inventive project using ArcGIS.

Named the MapAction Kiosk, the new GIS solution developed operates using the principles of web mapping and runs on a lightweight laptop connected to a powerful WiFi router. Aid workers in the vicinity of MapAction's field base can connect to the Kiosk via WiFi and print additional copies of any maps produced by MapAction's volunteer team. In addition, they can view interactive maps, zoom into specific regions and turn on required data layers to create any customised maps that they might need to inform aid missions. Finally, responders can use the Kiosk to download MapAction's up-to-date spatial data and incorporate it into their own GIS systems.

The Benefits

MapAction will continue to produce the paper maps that aid organisations around the world have come to rely on. However, now, this unique charity will also be able to make its invaluable location-based intelligence accessible in digital formats to many more people, more quickly, to improve the effectiveness of life-saving humanitarian missions.

Notably, the MapAction Kiosk will help the charity to distribute its maps to aid workers who might otherwise not have had access to a paper copy. It will therefore make situational data accessible to a wider audience and facilitate greater collaboration between multiple aid agencies and local groups. Pennells says: "The Kiosk helps us to give a common operational picture to all responders and agencies working on-the- ground in a disaster situation. The sooner they have this shared knowledge, the closer they can work together to reach people at risk."

In addition, the Kiosk gives aid workers the ability to create their own customised maps for the first time. They can gain instant access to the mapping intelligence they need – in the precise format they need it – to enable them to respond quickly to emerging new scenarios.

"The MapAction Kiosk enables us to provide maps and situational information to more people, very quickly, helping them to make better, faster decisions and alleviate human suffering"

Andy Adrian, CEPC Right-of-Way Coordinator

Supporting diverse and vulnerable communities

With its diverse and varied population, Oxfordshire County Council aims to provide excellent services to all its residents while promoting equality and ensuring fairness.

The Challenge

Oxfordshire County Council's GIS (Geographic Information Systems) team has an extremely broad brief to provide ICT support across the organisation, including Oxfordshire County Council's Fire & Rescue Service. This small team assesses requirements and requests, gathers business analysis and provides user support while building interactive dashboards and web and mobile apps for internal and external use.

The Solution

Under its Enterprise Licence Agreement, Oxfordshire County Council has been using Esri's ArcGIS platform exclusively since 2017 as its corporate GIS infrastructure. This has enabled the GIS team to build out a greater number of requirements, more quickly and efficiently, and help transform service delivery.

In March 2019 the Safe and Well service went digital. Workforce for ArcGIS was used to coordinate and allocate daily visits before crews left their stations and questionnaires incorporating broader health messages from the public health team were built using Survey123 for ArcGIS. The electronic forms were filled in onsite at residents' homes and when there was no signal or internet available, users could carry on working and save a copy of the form on their mobile device. When the devices were next connected, completed surveys were synced directly back to the database in the office so colleagues could see which assessments had been undertaken, and the data visible on a central management dashboard.
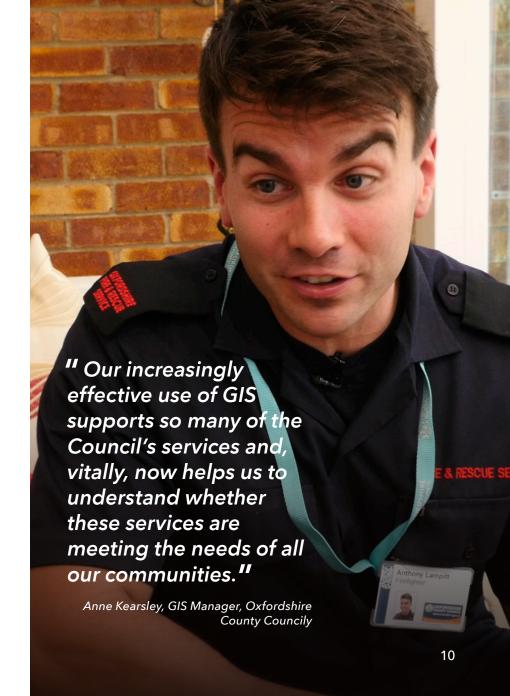
The Benefits

Supporting Diversity

The redesigned service demonstrates Oxfordshire County Council's responsibility as a Stonewall Diversity Champion, committed to sexual orientation and gender identify equality. In its second year of inclusion the Council now ranks at 127 (out of 503 organisations) in the Stonewall Workplace Equality Index, compared to its previous ranking at 220 out of 445.

Secure data collection

Users can confidently collect anonymous data, securely, enabling the Council to collect vital information which ensures that the service it provides residents is inclusive to those of all identities and orientations, as well as help the organisation climb the Stonewall Workplace Equality Index.

Saving time

The use of ArcGIS apps has significantly enhanced the efficiency of reporting in the field as well as back in the office. Firefighters making home visits report that the quality of their visits and range of services offered has improved, and they feel more confident and competent in carrying out their work. The administration process has also been streamlined as admin staff no longer have to input data collected from paper-based surveys, reducing the potential for human error.

" Our increasingly effective use of GIS supports so many of the Council's services and, vitally, now helps us to understand whether these services are meeting the needs of all our communities."

Anne Kearsley, GIS Manager, Oxfordshire County Councily

Optimising the role of 60,000 volunteers

Volunteers play an invaluable role in helping the National Trust to protect and care for the nation's cultural heritage and natural landscapes. The not-for-profit organisation is now embracing crowdsourcing and is using ArcGIS in a series of ground-breaking pilot projects that will enable more people to get involved and make a valuable contribution to its conservation work.

The Challenge

The National Trust has over 60,000 volunteers who play a vital role in helping the charity to manage 250,000 hectares of land, 778 miles of coastline, 80,000 archaeological features and 28,000 buildings. The organisation wanted to optimise the role played by this enthusiastic group and find a way to engage even more people in its activities. At the same time, it wanted to show its volunteers the value of their contribution and help them to feel more involved in conservation projects.

The Solution

The National Trust is now pioneering new ways to engage with volunteers using Esri's ArcGIS platform. In a series of pilot projects, the organisation is beginning to use ArcGIS mobile solutions, including Collector for ArcGIS and Survey123 for ArcGIS, to allow volunteers to upload information from their smartphones and tablets to a central portal. Called ArcGIS Hub Premium, this portal provides secure, authenticated identity for huge numbers of volunteers, which allows them to see the data they have collected, in the context of the wider project. Volunteers can therefore appreciate what they have done and the value of their contribution to the National Trust's conservation schemes.

In the first of the National Trust's pilot solutions, volunteers in the Peak District are gathering data on the condition of archaeological features on National Trust land, including barrows, ruins and ancient quarries. They are then uploading and sharing this data via ArcGIS Hub Premium, helping the National Trust to build up a clearer picture of the condition of ancient sites that are rarely visited but are nonetheless important to the history of the nation.

The Benefits

Well-informed decisions about conservation and maintenance

Over time, the use of the new ArcGIS volunteering apps will enable the National Trust to collect a larger quantity of high quality data, which it can use to support its decision making. In particular, the organisation anticipates that volunteers will be able to help it build up a far more comprehensive picture of the condition of assets and habitats, such as signs and ponds. It can then use this information to see where it should prioritise its conservation activities and how best to plan effective, proactive maintenance programmes.

More successful collaborative conservation projects

Although it is still early days, the National Trust already recognises that ArcGIS Hub Premium is a highly effective tool for improving collaboration with large numbers of volunteers and partners. In initiatives such as the Riverlands project near Manchester, the organisation expects ArcGIS Hub Premium to play a pivotal role in enabling large numbers of people to share data and work together. "It feels exciting," Davies says. "Our pilots are putting crowdsourcing into practice and demonstrating how volunteering programmes can be managed more successfully in the future."

" ArcGIS Hub Premium will allow individual volunteers to see the emergence of critical conservation issues and appreciate the importance of their contribution to the project. "

Huw Davies, Head of Conservation,
National Trust

Realising Optimised Field Operations

A GIS enables the virtuous cycle of efficiency in field activities. Organisations 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 organisations make faster and better decisions.

Get more information:
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