

Esri News

for Transportation

Summer 2014

PortMaps: A Groundbreaking Platform for Port Management

Port of Rotterdam Ensures a Resilient Future with ArcGIS

The Port of Rotterdam (POR) bustles like a metropolis. The Netherlands port handles more commercial shipping than any other port in Europe and more than most ports in the world. In 2013, it docked more than 130,000 vessels and processed a staggering 440 million tons of shipping cargo. Perched on the North Sea, it stretches 26 miles inland along the river Maas, the primary gateway to more than 500 million European consumers.

Industrial Processing Center

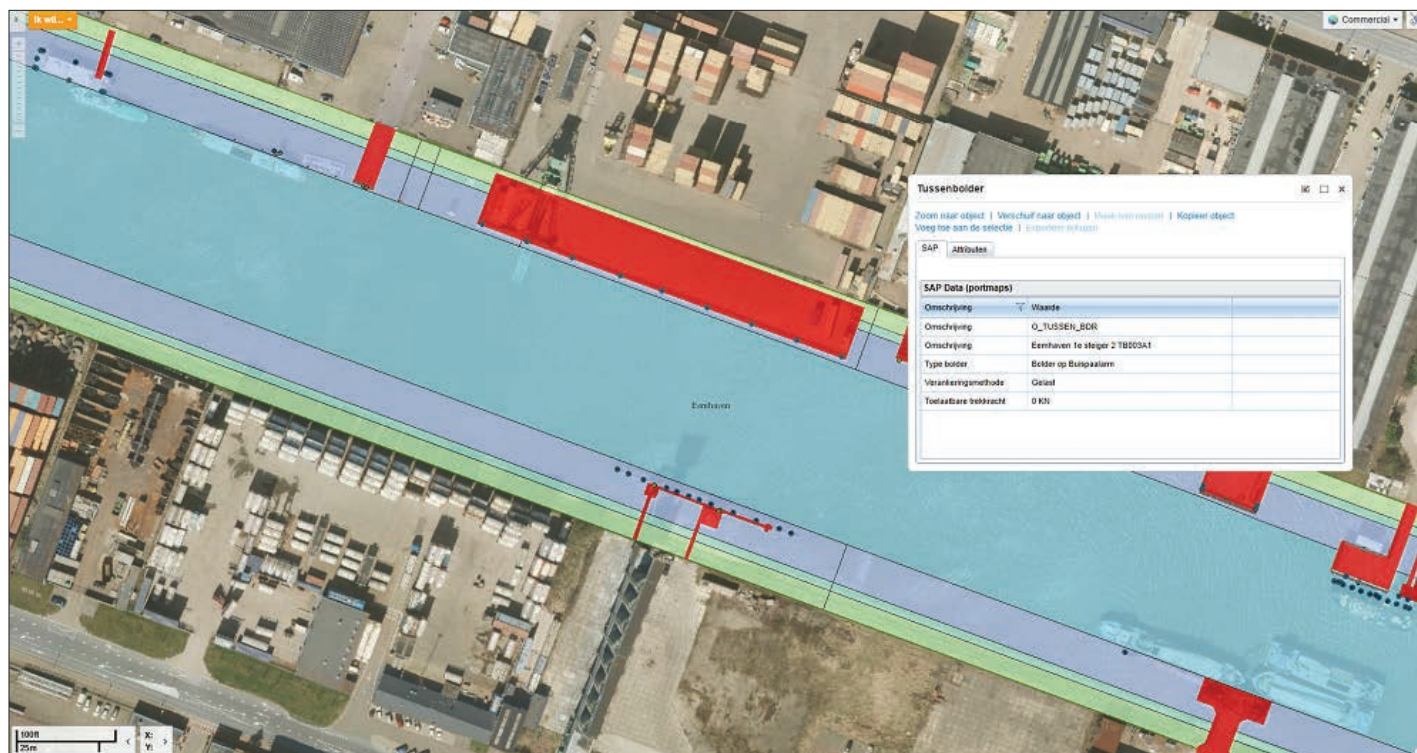
More than a large place where ships load and unload their cargo, POR forms an immense industrial center where raw material gets processed into commercial products. Oil is refined, synthetics are produced, and fruit is repacked for wholesale. Around 90,000 people work at the port in some capacity to accomplish this work.

The Port of Rotterdam Authority has relied on a complicated support system

just to maintain its enterprise operations. As a world-class port, POR can't be content with mere maintenance. Ports grow and expand. When they reach the limits of outward expansion, they still need to grow internal efficiencies as operations increase in complexity.

To ensure POR met the fiscal goals of a recent expansion, the authority needed a platform to connect all its systems,

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↑ In the PortMaps viewer, users can access live information from SAP and the document management system using a configured pop-up dialog box.

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Esri News for Transportation is a publication of the Transportation Group of Esri.

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Manager's Corner

Terry Bills
Esri Industry Manager
Transportation and
Logistics

Being connected to government means that transportation networks, such as ports, airports, and rail, must be transparent, compliant, and resilient. Public expectations for shared information, as well as government regulations and rules, put pressure on organizations to meet complicated demands, often with an IT infrastructure not quite up to the task. Today, many of these organizations are realizing they have the resources to create focused systems and apps to deliver transparency and foster resilience with a simple solution: the ArcGIS platform.

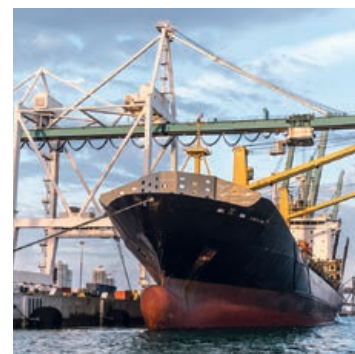
Ports are particularly vulnerable to problems with information siloing and climate change. In this issue, you'll read about how the Port of Rotterdam decided to build resilience by replacing its legacy GIS with a modern geospatial platform. The port hired Esri Professional Services to work with its staff to implement a comprehensive port management system designed to shorten workflows and grow with the burgeoning organization.

Like ports, airports struggle to run a tighter ship. With many vendors occupying the same space and dozens of departments needing coordination, GIS has come to the rescue to fill that coordinating role. In this issue, you'll read about how Esri partner GeoJobe helped Baton Rouge Regional Airport implement a GIS to connect all its departments and bring immediate efficiency to the medium-sized airport.

On the rail side, Bay Area Rapid Transit (BART) has undergone a spectacular transformation after the overhaul of its GIS. Led by geospatial technology expert Travis Engstrom, BART's across-the-board improvement in efficiency and return on investment is one of the more remarkable success stories we've seen in some time, earning Engstrom the title "GIS Hero" in last winter's *ArcNews*.

Equally notable on the rail side is the Federal Rail Administration (FRA) creation of a focused app that serves rail crossing information to anyone that needs it. Called the Rail Crossing Locator, the app was created with Esri mobile APIs and software development kits and pulls detailed information about all national rail crossings from the nation's rail databases. This app delivers accessibility to rail inspectors and the public, and it's available for free at the Apple App Store.

GIS continues to prove itself as an all-encompassing and comprehensive solution for large-scale enterprise implementations and as a focused solution for specific needs. In many cases, organizations use it for both purposes. Transportation organizations are using Esri software to cover the gamut of demands they're faced with, whether for specific app and web services or widespread oversight of the enterprise. With the Esri User Conference just around the corner, I'm excited to see how our partners and transportation organizations continue to innovate new and resilient solutions for the nation's increasing transit demands.



PortMaps: A Groundbreaking Platform for Port Management continued from cover

improve usability, and get all departments on the same page. Last year, after a competitive bid that tested top asset management systems in a lengthy proof-of-concept phase, POR tapped the expertise of the Esri Nederland B.V. and Esri Professional Services teams to implement the ArcGIS platform and unify operations from bottom to top.

"It boiled down to uniformity of user experience and how quickly the platform could be fully operational," says Frits van der Schaaf, business development director for Esri Nederland. "Staff needed workflows to be tight and effective and the transition to be fast and seamless."

Maasvlakte 2: The Final Expansion

Last year, the port completed a massive, €1.5 billion expansion into the North Sea, a project called Maasvlakte 2 (m2). That expansion will define the port's total land area for decades to come. Further growth means working more efficiently to generate greater revenue from every available acre. Until last year, POR's enterprise management consisted of a legacy GIS that threatened to inhibit the authority's internal growth and profitability in the wake of m2. Its main flaw was that it couldn't easily connect to

dozens of other business systems used to manage operations.

"There won't be a third Maasvlakte expansion," says Erwin Rademaker, program manager for PortMaps. "The only way to let the shipping traffic grow is to handle the available space and resources we have more efficiently and intelligently."

PortMaps

The port authority staff weren't simply looking for a contractor to do the work. They needed a partner willing to work with them and their affiliate ports to transform how they manage assets. As staff learned more about what a modern GIS could do, they embraced the idea of a complete geospatial platform to manage all the port's business.

When Esri told them it could be done in five months, staff could hardly believe it. The other best-of-breed systems fell short of providing a snappy user experience, and none of them could be configured in such a short time frame. ArcGIS was the only platform that could phase out 49 of the port's systems at once with relatively little disruption. Esri Professional Services and Esri Nederland worked with the authority to integrate the ArcGIS platform with key enterprise business systems, including SAP, AutoCAD, and Microsoft Office; develop workflows and an enterprise data model; and build a geodatabase that includes port assets and boundaries, parcels and associated land records, utilities, transportation, bathymetry, imagery, and lidar data.

The authority's requirement for asset management was so specific that staff mandated the workflow should only take three mouse clicks (or touch screen taps) for anyone at the port to find any asset. The implementation thus required migrating more than 1,500 layers of port data into an enterprise ArcGIS database and developing a data maintenance workflow for 10 core port objects. The idea was to work through many of the steps with port authority employees and enable them to perform the rest of those steps themselves.

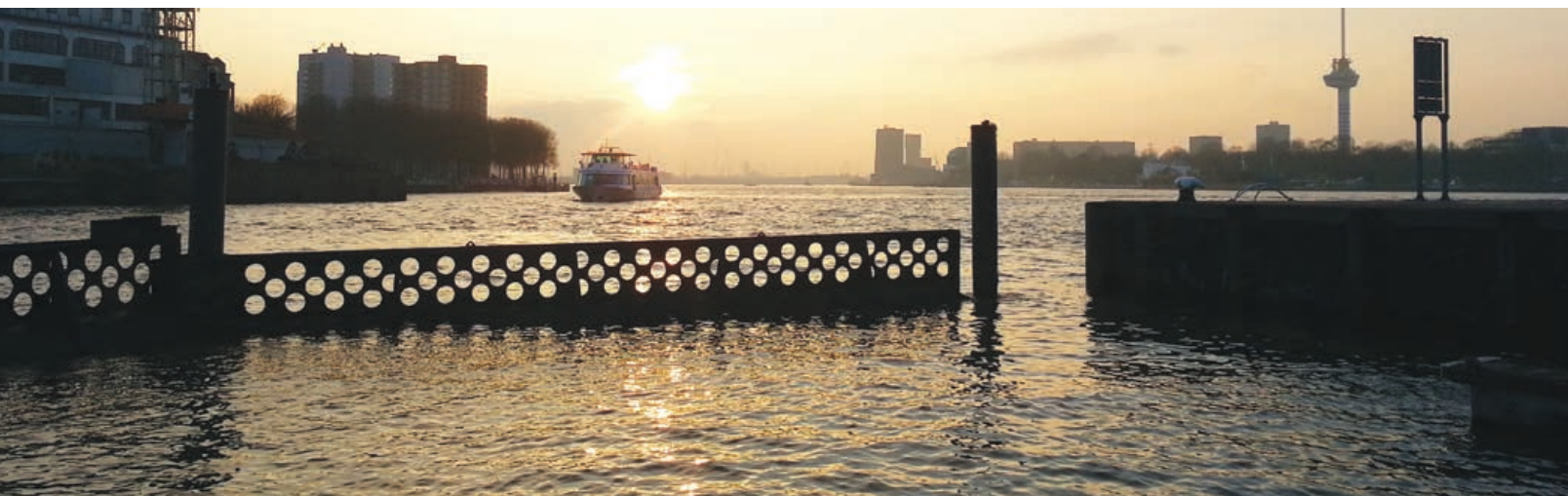
"Much of the staff training involved staff actively participating in the data conversion process," says van der Schaaf. "Once data was migrated and the initial layers created, work shifted to customizing templates for information products needed by the port, such as the port basemap and dredging atlas."

The first phase of the implementation took five months to complete and was deployed in January 2014 as PortMaps. At this formative stage, PortMaps easily outperforms the port's old GIS as an asset management system. It uses a detailed map of the port as a starting point from which information can be requested by anyone at any time. Departments are also able to instantly share information on mobile devices.

In Operation

Port authority employees currently use PortMaps to access and update a range of port information. It plays a central role in

↓ Even though Rotterdam is Europe's largest cargo port, it is much more than a shipping hub. The massive industrial complex at the port is a major economic driver for the region. (Photo by Marten Hogeweg, Esri Professional Services.)



the organization's environmental management, security and safety processes (e.g., maritime traffic control), area planning, port development, and incident response. For example, an employee can click or tap on the main map in PortMaps to view a contract stored in SAP that belongs to the part of a quay (concrete platform where goods are offloaded). Vehicles and other assets can be tracked and monitored and their associated records viewed. The map/document connection simplifies staff work, eliminating the leapfrogging from application to application that characterized the old information system.

"There are all sorts of objects on the terrain: railroads, piping, electricity cables, and so forth," says Rademaker. "ArcGIS clearly shows the intersection of these objects and opens access to their associated documentation through simple pop-up [dialog boxes], giving the port a much more sensible and immediate system for port management."

Applicability and What's Next

The POR Authority considers PortMaps to be a groundbreaking approach to port management. As the GIS foundation at POR gains strength, the authority plans to implement the ArcGIS platform in its affiliate ports around the world. The next two phases will further integrate the platform with expert systems for structural degradation analysis and risk/business value assessment.

"The key factor in POR's excitement was discovering the applicability of a modern GIS," says Chris Cappelli, Esri global director of sales. "Early on, staff could see the GIS could reliably be applied to every aspect of port business."

For more information, contact Guy Noll, Esri Professional Services, at gnoll@esri.com.

Updated Esri Collector and Operations Dashboard Apps Speed Workflow

Esri has released new versions of Collector for ArcGIS and Operations Dashboard for ArcGIS. The Collector app now includes the ability to download maps to your smartphone or tablet device to collect and edit data when working offline. Operations Dashboard has added support for browsers, so you can view operations on your iPad or Android tablet or from your desktop. Both apps are available at no cost to ArcGIS Online subscribers and Portal for ArcGIS customers.

Collector for ArcGIS

Collector for ArcGIS is a configurable field data collection app for iOS and Android devices. With the latest release, maps can be used anywhere regardless of network availability. You can take map areas offline and work with them in remote locations where network availability is either nonexistent or unreliable. Users can download Esri basemaps as well as their own basemaps managed within their ArcGIS organization.

Operations Dashboard for ArcGIS

Operations Dashboard for ArcGIS provides a common operational picture for monitoring, tracking, and reporting events within your organization. The new version of Operations Dashboard now supports web browsers. That means you can have the same real-time view of operations on your tablet that you see on your Windows desktop.

Data sources inside Operations Dashboard have also been improved in the 10.2.2 version of the app. You can now power operational views using dynamic map services, as well as feature services, and other types of layers including real-time weather, traffic, and social media feeds.

Collector for ArcGIS can be downloaded from the Apple App Store and Google Play. Operations Dashboard is available through ArcGIS Online. Portal for ArcGIS users can access the Operations Dashboard app from the Customer Care portal.

Learn more about ArcGIS Online at esri.com/agol.



Turning a Requirement into a Benefit

Enterprise GIS Helps Airport Use the Data It Collects

The enterprise GIS developed by a Louisiana airport helps not only to meet federal reporting requirements but also to save money and better connect the airport with its customers.

Recently, the Federal Aviation Administration (FAA) began implementing NextGen data requirements for airports. NextGen is an umbrella term for the ongoing transformation of the National Airspace System (NAS) in the United States from a ground-based system of air traffic control to a satellite-based system of air traffic management. The NextGen initiative mandates that airports collect survey-grade datasets, called Airport GIS (A-GIS), so the FAA can manage the spatial data needed to support safe aviation. Although many small and medium-sized airports without major IT resources are fulfilling the requirements of the FAA, many do not fully benefit from the A-GIS data they collect.

To address that concern, Baton Rouge Metropolitan Airport (BTR), located in the southeast portion of Louisiana along the Mississippi River, partnered with GEO-Jobe GIS Consulting to extend the reach of its A-GIS data. With some grant money received through ongoing airport projects that can benefit from GIS, the airport was able to implement an enterprise GIS solution that includes Esri's Aeronautical Solution and ArcGIS Online.

Coordination Challenges and Cost Cutting

Like municipalities, airports comprise different departments and interact with various entities. Airports host multiple airlines, fixed-base operators (commercial businesses that provide aeronautical services), and retail tenants. Airports must maintain the highest level of coordination to ensure consistent revenue generation and comply with FAA standards

and constantly changing land-use rules. In addition, to stay competitive, airports must execute expensive, multiyear airport improvement projects: runway extensions, obstruction analysis, pavement projects, and terminal improvements.

"To confront the rising costs, airport managers sometimes turn to IT consultants to implement 'improved' technology," said Eric Edmonds, vice president of marketing at GEO-Jobe. "However, once installed, many of their investments never actually get used by airport staff. Over time, the glamour and promise of technology wears off and staff just gets cynical."

Building Trust

BTR wanted to avoid that situation. In 2010, the airport partnered with GEO-Jobe to perform a health check of its operations. Over the course of a week, GEO-Jobe met with airport personnel

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→ MapSearch for docSTAR associates documents to geographic locations. Users can search by keyword or by clicking on the map.

MapSearch for docSTAR

Document Image: Letterbox Full Scale Page 1 of pages -1-

CERTIFICATION OF RESTRICTIONS ON LOBBYING

DocSTAR API Connection

Key Word Search Geography Search

Search Tools

Search for: Documents Comparison: Contains

Search by: Keyword

Begin Search

Details	Modified	Document Title
Details	2012-05-03T16:17:22	-3-Certifications, Agreement
Details	2011-10-26T11:39:00	001
Details	2011-10-26T11:39:01	002
Details	2011-10-26T11:39:01	003
Details	2011-10-26T11:39:02	004
Details	2011-10-26T11:39:05	005
Details	2011-10-26T11:39:07	006
Details	2011-10-26T11:39:11	007
Details	2011-10-26T11:39:14	008
Details	2011-10-26T11:39:16	009
Details	2011-10-26T11:39:19	010
Details	2011-10-26T11:39:22	011
Details	2011-10-26T11:39:24	012
Details	2011-10-26T11:39:26	013

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and found opportunities for GIS to play a critical role in the decision making and daily operations of the airport.

Enterprise health checks are rarely welcomed by a work force. Like a patient visiting a new doctor, departments can be suspicious of an outsider evaluating the inner workings of a familiar system. "Our initial presentation on basic Airport GIS wasn't well received by several administrators," said Edmonds. However, when GEO-Jobe staff met with department heads individually, managers relaxed and talked openly. Casual conversations with BTR staff revealed operational pain points. These interactions built trust and identified opportunities to make processes more efficient.

Initial Implementation

The solution born from GEO-Jobe's assessment was an enterprise GIS that allowed the airport to push its A-GIS to the FAA. "We started by mining data and installing all the necessary hardware and software to host and serve it," said Edmonds. Collecting existing GIS datasets from local government agencies and adding them to the airport's geodatabase was a crucial first step.

To make all facility information accessible through the platform, Edmonds's team converted BTR's Airport Layout Plan and information, which included CAD drawings and blueprints of

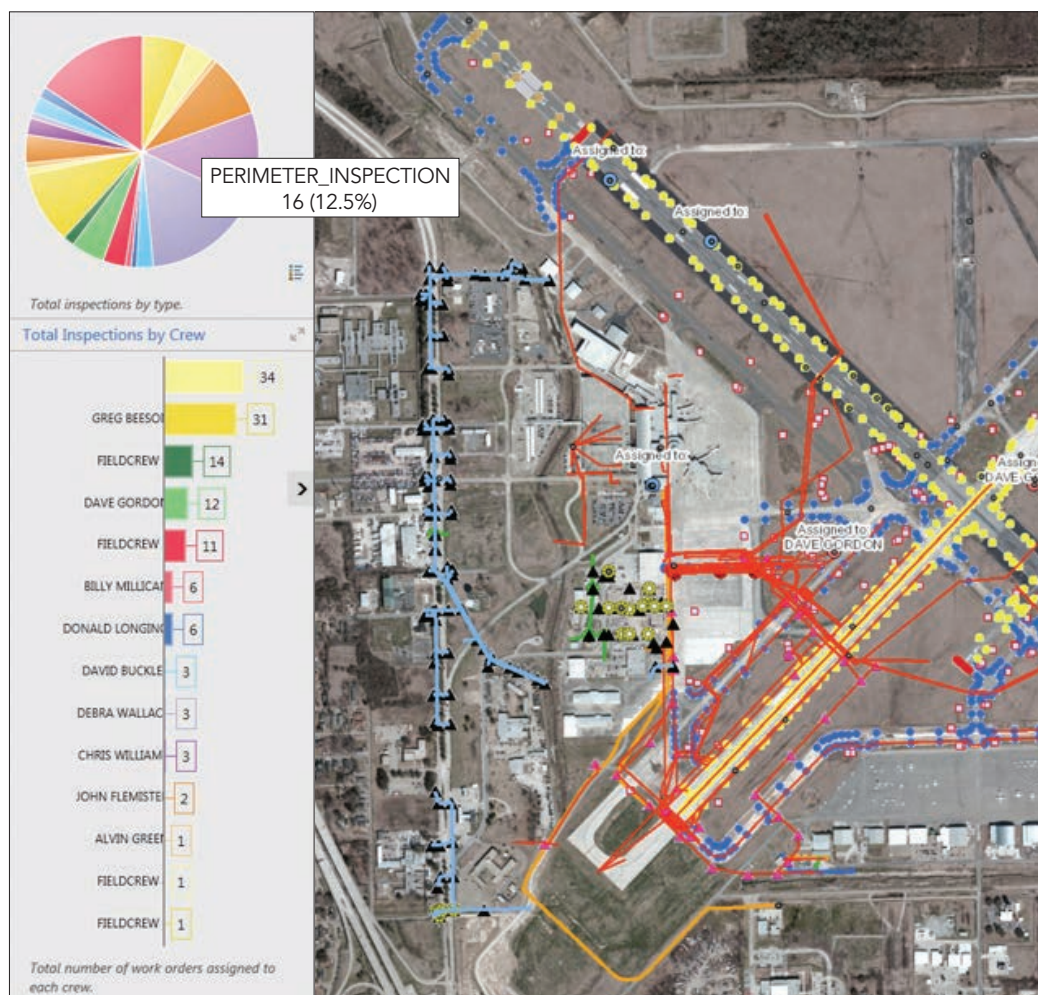
construction projects, into a format that could be added to a geodatabase. ArcGIS for Server, ArcGIS Online, and Esri Aeronautical Solution were used to give the airport a central platform for creating and sharing GIS data across departments and with the FAA.

In the first show-and-tell meeting with the airport after the initial implementation, one of the staff members asked GEO-Jobe to calculate the area of a recently acquired parcel adjacent to the airport. The airport had just spent several days surveying the property even though it only needed submeter approximations. To show how even the simplest GIS tools can empower them, one of GEO-Jobe's staff members traced the same parcel using the measuring tool in ArcGIS Online.

"It took less than 10 seconds to trace and calculate the area," said Edmonds. "The difference between calculations was only a few feet."

Simplifying Inspections

GEO-Jobe's evaluation of one of the airport's most critical procedures—Part 139 Inspections—came early in the needs assessment. (The FAA, under Part 139 of Title 14, Code of Federal Regulations, issues Airport Operating Certificates and conducts periodic inspections to ensure airports are meeting the requirements of Part 139.) Inspections were a major headache for the Operations Department. After carefully canvassing the runway and taking handwritten notes, inspectors would input their notes into a



→ The Part 139 Inspection Dashboard provides in-office users with focused inspection information for monitoring activities throughout the day.

↑ Part 139 Inspection Mobile provides a single point for work order status information (inspection, creation, dispatch, and completion) in the field.

↑ BTR is strategically organized within ArcGIS Online through 16 defined groups.



system in the office that generated new work orders. The status of these work orders was tracked on a whiteboard.

GEO-Jobe eliminated that cumbersome process by creating a Part 139 Inspection app that enables field crews to create, dispatch, and complete work orders and inspection reports on the fly. With the app, the operations manager can also track the status of inspections and work orders and locate his field crew at all times.

Sensible Documentation Access

To reduce the generation of paperwork and archiving of paper documents, GEO-Jobe refined the airport's document management process by creating a location-based document management system. The system enabled instant classification of all paperwork, which was fully accessible via a web application to staff who had the necessary security clearances.

The system resembles a typical digital library catalog. All digitized documents are linked to features and areas on the airport's main map viewer. By clicking on a specific property, airport staff can

quickly pull up documents such as lease agreements, construction bids, architectural drawings, proposals, building footprints, bid acceptance, and repair orders. Correspondence between the airport, its consultants, and the local government is also tracked in the application.

The later stages of the airport's GIS overhaul will involve creating additional apps for both the airport and the public. Several apps that are currently being registered with the airport's ArcGIS Online account include maps for airport information, marketing, construction status, and noise mitigation status. Through its partnership with GEO-Jobe, BTR has become a model for small- to medium-sized airports.

"The project has proved that, with the right platform, airports can comply with FAA standards and also use the data to build a full-scale GIS that can be used across airport departments and better serve travelers and the local community," said Edmonds.

Federal Rail Administration Improves Rail Crossing Safety with GIS App

“While we’ve made significant progress in the reduction of highway-grade crossing incidents over the last decade, much more work remains to be done. This technology will be one more tool to help us reach our goal of zero fatalities.”

Joseph Szabo, Federal Railroad Administration Administrator

The Federal Railroad Administration (FRA) recently released a free mapping app, available from the Apple App Store, that helps improve highway-rail grade crossing safety. The Railroad Crossing Locator provides transportation and safety agencies with a convenient mobile querying tool and the public an interactive channel to learn about the nation’s highway-rail grade crossings.

With 140,000 miles of rail network in the United States, freight and passenger railroads intersect US highways and roads more than 212,000 times. These intersections pose potential hazards for pedestrians, rail travelers, and commuters. Built with Esri’s ArcGIS API for iOS and ArcGIS Runtime SDK for iOS, the app helps locate thousands of rail crossings throughout the United States and displays key safety and descriptive information, including official United States Department of Transportation (USDOT) records.

USDOT assigns a unique identification number (crossing ID) to each grade crossing. States or railroad companies that own grade crossings must provide essential physical and operational information about these crossings that goes into a national inventory maintained by USDOT and is made available to the general public and safety and emergency response entities. Making federal datasets easily accessed by the public supports key White House transparency initiatives that recommend that agencies find ways to deliver safety data to the public.

“While we’ve made significant progress in the reduction of highway-grade crossing incidents over the last decade, much more work remains to be done,” said FRA administrator Joseph Szabo. “This technology will be one more tool to help us reach our goal of zero fatalities.”

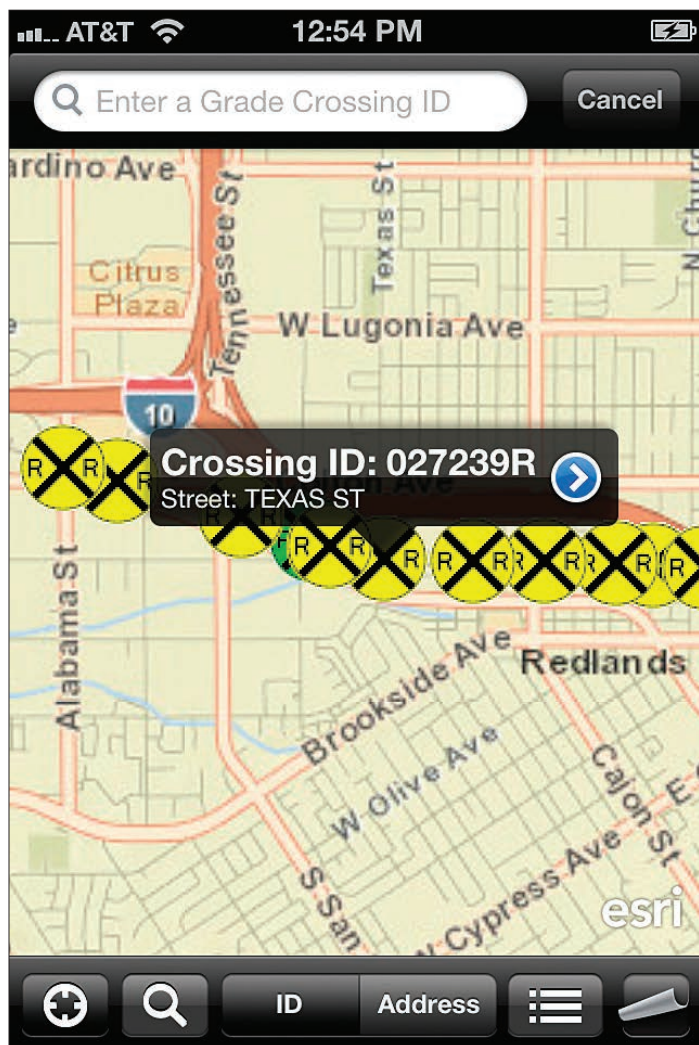
In 2008, the FRA GIS team launched its first publicly available grade crossing

mapping application. Called the Pop-Up Viewer, this simple mapping utility used Esri server technology integrated with a records search tool on the FRA’s safety data website. Although highly successful compared to paper record search methods, the viewer was optimized for web browsers on desktop computers. Typically using a laptop in the field, transportation and safety personnel would have to go through a multistep process to access the location and related records for an individual crossing. Five years later, agencies and the public have come to expect faster and more convenient ways of getting information.

In 2012, the FRA decided to modernize the grade crossing mapping application. Its GIS team worked with regional safety staff, state department of transportation officials, and others, to determine the core functionality needed to upgrade the application. The consensus was that the mobile application should have an intuitive, simple-to-use interface. Rather than replace the desktop information resource available at FRA’s website, this new tool would complement the FRA’s collection of investigative tools for professionals and the public.

A few years ago, Esri released its ArcGIS API for iOS and ArcGIS Runtime SDK for iOS for creating apps that run on Apple mobile devices. The FRA saw that this could provide a better method for getting rail crossing information to relevant personnel and the public. After gathering user input and discussing the project with the IT and Public Affairs Office, the GIS team came up with interface and functionality requirements and decided to work with Esri Professional Services to build the Rail Crossing Locator, a native iOS app.

This app consumes the FRA’s ArcGIS for Server map services, allowing users



↑ Users can search for rail crossings by ID number or address.



↑ The Details page gives basic crossing attributes.

to perform queries on the FRA Grade Crossings spatial database. That database contains an inventory of all highway-rail crossings, with accurate spatial locations throughout the United States and information about the crossing owners; crossing locations; and highway, traffic control, and physical characteristics of the crossing. The app also allows users to access official USDOT Inventory Record and Accident/ Incident records for each crossing.

The app initially pinpoints the user's location and shows nearby crossings. The aerial basemap is the default, but three other basemaps are available. The crossings symbols are color coded to denote whether the intersection is at, above, or below grade. Selecting the crossing

displays a pop-up window with the crossing ID and address of the intersection and provides access to an additional page that shows a selection of the main attributes (e.g., operating railroad, road name, county) and links to the crossing's official USDOT Inventory Record and Incident Report. A convenient reporting option allows the user to send an e-mail to the FRA regarding a nonemergency issue at a specific crossing, which is automatically populated with the specific crossing ID. Besides finding crossings near their location, users can search for crossings by USDOT crossing ID or street address. Using the embedded filter tool, users can also find grade crossings by selected characteristics.

The Railroad Crossing Locator app gives easy access to information that improves investigative and reporting processes. Citizens can also use the tool to modify travel plans to avoid potential delays at crossings and be more informed about safety issues.

Quick Learner Saves BART Millions of Dollars



Travis W. Engstrom

This article is part of an ongoing series honoring individuals who have made a difference in the world by applying a GIS solution to conservation or community challenges. Since these unique individuals have been selected for their innovations or special achievements, the series is appropriately named GIS Heroes. Esri recognizes Travis W. Engstrom as a GIS hero.

With six siblings and a journeyman police chief for a dad, Travis W. Engstrom, manager of information systems at about San Francisco Bay Area Rapid Transit District (BART), learned independence at a young age. That independence drove his work ethic early on, inoculating him to the pressure of large-scale projects. The career path that eventually led him to overhaul the BART GIS began in 1999.

That's when the City of Lakeport, California, hired him to lead its fledgling GIS effort using hardware and software acquired from a grant. Engstrom was assigned to map the city's water, sewer, and storm drain infrastructure. Engstrom confidently dove right in with no previous GIS training or experience.

In three months, Engstrom built an entire water, sewer, and storm drain layout for Lakeport's community of 5,000 residents. The effort included manually capturing utility assets using an ArcPad technology-enabled GPS receiver on more than 62 miles of curb, all on foot.

Later in his career, Engstrom applied his GIS expertise in a more nontraditional context for a nonprofit in Durban, South Africa, organizing volunteers and relief aid using GIS. There, he performed analysis with Esri demographic data tools and made maps in ArcGIS while managing a staff of 120.

"The organization I worked for was massively GIS-centric," says Engstrom. "It used geospatial technology to focus its mission, find people in need, and plan the distribution of its outreach services. This was a great experience in teaching me how to use GIS creatively, and it paid huge dividends later on."

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↑ Built with ArcGIS Online, BART's internal mapping system (Enterprise GIS-Enhanced Base Map) serves the mapping needs of every division within the agency.

Consultation

Engstrom went on to earn a law degree from University of California, Berkeley, and simultaneously work as a private GIS consultant with North Star Precision Mapping, LLC. For 10 years, Engstrom performed a mix of municipal consultation and staff training for more than 1,000 government agencies. The work could be grueling. At times, Engstrom averaged 20 to 30 training sessions a month, educating agency staff on everything from how to jump-start GIS services to how to manage assets more efficiently. At the same time, he was performing GIS builds from scratch for numerous Native American tribal governments throughout the Southwest.

Eventually, Engstrom—who was married and had two sons—tired of living out of a suitcase and working on the weekends. When the opportunity came to overhaul the GIS of one of the most sophisticated public transportation systems in North America, he jumped at the chance.

BART

In 2011, BART contacted professional services firm Universal Field Services, Inc., to create an enterprise GIS pilot project. The firm passed the request on to Engstrom, well aware of his record and ability to create successful GIS builds from the bottom up. Being within driving distance of his Bay Area residence, the new opportunity was just the move he wanted. Although it was only a 10-month contract to perform a total assessment of BART's needs and develop a long-term enterprise GIS strategy for the network, Engstrom recognized an opportunity to build something great.

"BART wanted me to come up with budget suggestions, staffing suggestions, and business cases to do a full return-on-investment analysis," says Engstrom. "I was confident that the

project would be a success simply because BART [staff] said they'd continue the effort if the proof of concept worked. I had enough experience under my belt to know proof would be ably demonstrated in a short amount of time."

Engstrom enjoyed the BART assignment and the freedom it offered to develop innovative enterprise solutions. When the opportunity arose to manage the IT division, he applied for and was given the job.

A Babel Problem

With 3,200 employees, 103 miles of infrastructure, and 44 stations, BART presented some significant communication challenges. One of the agency's biggest obstacles was the years-long accumulation of nonstandardized terminology by different groups, which led to information silos. Different offices used different names for the same objects, which hindered communication and made uniform mapping impossible.

To put that in perspective, at the time of Engstrom's hiring, the main maps used by BART were simple station maps to help orient the public. No maps existed to show the communities and jurisdictions through which trains ran. BART track schematics consisted of straight-line drawings without the benefit of scale or orientation. Engstrom's first major achievement at the agency was to create a uniform map with the exact geographic position of the entire system—including track centerlines, mileposts, and critical facilities. The map served as a key to "unsilo" the information between departments.

"That first map showed the potential of a comprehensive view with layers that could be toggled on and off according to the needs of every department," says Engstrom. "In very short

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Quick Learner Saves BART Millions of Dollars

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order, major decisions were made to convert to a standardized system where everyone spoke the same language.”

Putting the ROI in Irony

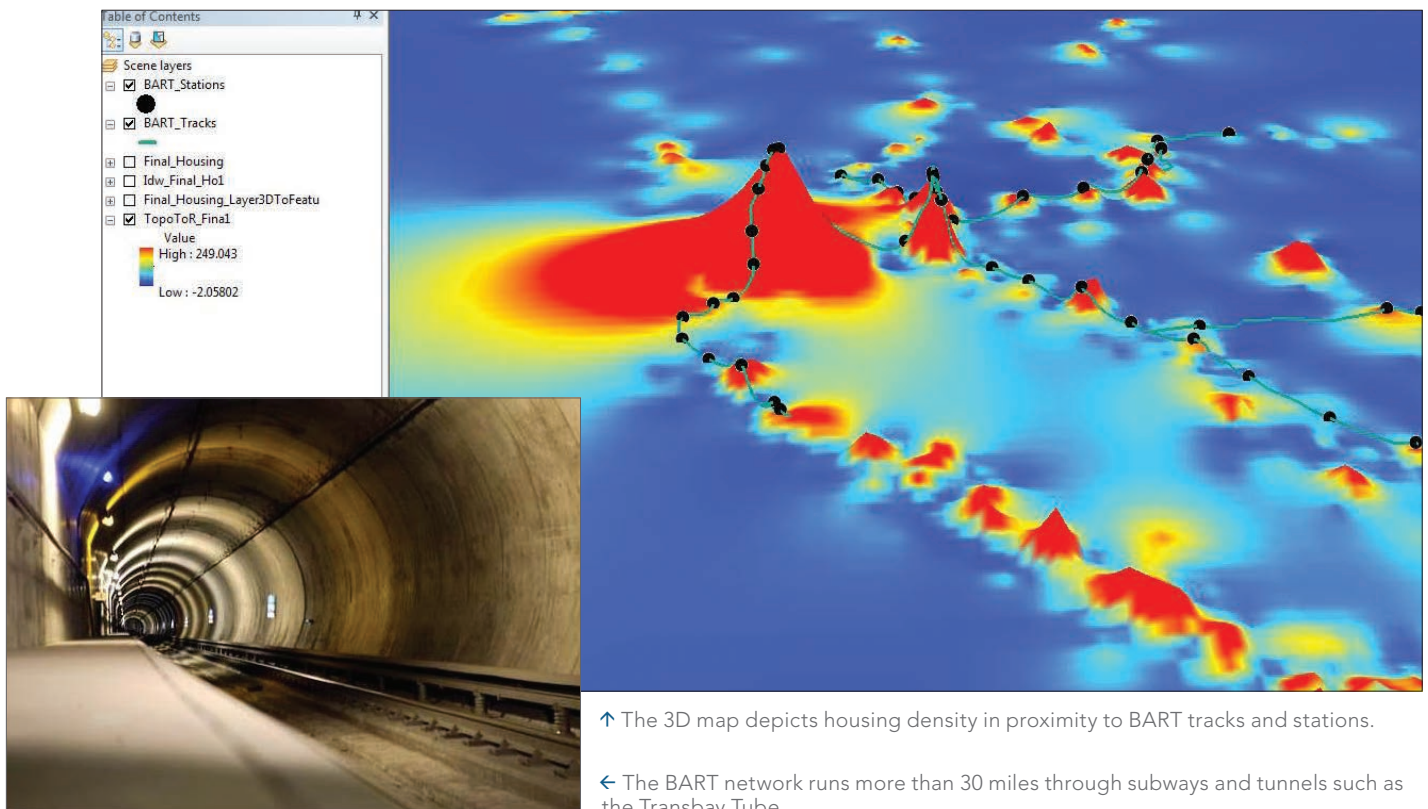
Being initially hired as a GIS contractor, it’s ironic that Engstrom ultimately helped BART achieve independence from GIS contractors. Prior to Engstrom’s enterprise developments, consultants would be hired to perform expensive research required by the federal government to understand the demography of the citizens BART served. Experienced in demographic analysis since his work in South Africa, Engstrom used Esri Community Analyst to conduct the same research. Community Analyst not only provided superior demographic reporting compared to the outsourced services BART previously paid for, but it also was integrated into the ArcGIS system, allowing demographic information to easily be included in any map-based report BART generated.

A significant portion of BART’s budget is spent on asset life cycle replacement programs, including dive teams to replace underwater infrastructure on the network’s Transbay Tube, which connects Oakland to San Francisco. Performing maintenance on this equipment involved sending out divers to manually inspect and carry out repairs. With little to no assistance from location technology, this work took a considerable amount of time and money.

“BART was able to convert existing AutoCAD drawings of the tube to GIS, reference this data against known survey records, and equip the diving teams with GPS coordinates showing exactly what features needed to be inspected and replaced,” says Engstrom. “That alone saved us \$800,000.”

Subsequent analysis revealed that, within five years, BART’s enterprise GIS will generate a net present value of \$6.6 million. Those numbers led BART to establish a permanent GIS team. The figures also forced a major shift in organizational perspective at BART, essentially making GIS the linchpin of the enterprise and expanding Engstrom’s role to include advanced anti-terrorism applications and cyber defense. Engstrom’s reorganization of BART’s GIS project has since spawned more than 100 other major projects at the agency, resulting in a new enterprise license agreement for all the Esri software BART uses.

For more information, contact Travis W. Engstrom, manager of information systems, BART—Office of the Chief Information Officer, at tengstrom@bart.gov.



↑ The 3D map depicts housing density in proximity to BART tracks and stations.

← The BART network runs more than 30 miles through subways and tunnels such as the Transbay Tube.

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