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Corpus Christi's MAJOR MOBILE INITIATIVE

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Michael Armstrong, CIO,
city of Corpus Christi



CITY OF
CORPUS
CHRISTI
MIS



photos by Eric Laycock

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Corpus Christi's Major Mobile Initiative

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by Sarah Howland

When it comes to mobile technology, the city of Corpus Christi has a whole lot going on — probably more than most companies would be able to take on at once. But, don't stop reading. While the city's maze of mobile projects may be more than you could handle concurrently, its vision for technology — and the impact that technology has had on its operations — makes the city's story an example anyone can benefit from.

Corpus Christi has a population of 305,000 across 147 square miles of land. There are 26 divisions within the city, with a variety of mobile crews employed to keep it running smoothly, including utilities crews; streets crews; garbage crews; maintenance crews; inspectors; police, fire, and EMS crews; parks crews; and animal control officers. In total, there are more than 1,500 mobile workers employed by Corpus Christi. The city is no stranger to technology. Significant investments in back office technology started in the 1980s with the city's GIS from Esri and continued in the early 2000s with the deployment of Maximo, an asset management system from IBM that Corpus uses for its work orders. New to the city, however, are the steps it has taken to standardize practices across departments and take its back office technologies into the field. "We had invested for years in back office technologies, but we realized that making that same type of investment in the mobile workforce is where the payoff is now," explains Michael Armstrong, CIO of the city of Corpus Christi.

Lack Of Real-Time Communication Breeds Inefficiency

Before the city invested in Maximo for work order management, the method Corpus used to field incoming calls from residents of the city was not only unstructured, but there was also no consistency among departments. For instance, a resident may call the streets department with a complaint about a pothole and the dispatcher at the streets department would take a handwritten note and then page a streets crew worker and tell him to go fix the issue. In the recreation department, on the other hand, an issue may be reported directly to a city council member, who would then email the recreation department. The recreation department would call a member of the recreation crew and read the email to him over the phone. "Working for local government is a lot like working for a very large conglomerate. We have 26 departments, each a separate company with a different line of business, but all under the same umbrella," explains Armstrong. "It was frustrating to the residents, because to get something resolved they were often passed around from department to department, left to hope they'd get to the right place. We desperately needed structure."

Besides the inconsistencies of the ad hoc approach, each system used was manual and very time-consuming. From handwritten notes and lengthy emails to numerous pages and calls out to the field, valuable time was being wasted in each department. "There was a variety of ways



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complaints and requests were coming in — phone, email, the mailbox at City Hall, a call to the mayor, a note to a council member,” says Armstrong. “Further, once each department got a request, it was handled differently. Each department handled its dispatching and record keeping its own way — some effectively, some horribly — but all manual. We were always worried about the hand-off of requests and the potential for them getting lost in the cracks and not addressed for months. It was a very haphazard system.” To overcome this challenge, Corpus decided to form a centralized call center where all requests would go (no matter which department they were ultimately routed to). This call center began using Maximo so that all calls were handled in the same way, and all call data was collected and stored in the same place, and all work orders created the same way. While this was a drastic improvement in the city’s back office operations, Corpus knew that to maximize the solution, the mobile workers needed access to the work orders and call data in real time.

Mobility Offers Next-Level Automation

When the city decided to go mobile, it didn’t stop at a simple mobile computing and work order management solution. Corpus also decided to deploy ArcGIS for Mobile, Esri’s mobile GIS. While the city had used ArcGIS from Esri for quite some time, it was used only in the back office to create paper map books that mobile workers carried. For instance, the water crew had maps (created using the back office GIS) of where every water main and manhole was in the city. When an issue arose, the crews used these maps to determine where the root of the problem was (versus digging up someone’s yard looking around for it). Maps were updated based on notes taken in the field. “Maps are used primarily to track items that are unseen at street level, like sewer or water pipes. Again, with a manual system, you get a manual description. ‘It looks like it’s about 30 feet from the house.’ They were frequently out of date because it was very difficult to keep them updated manually,” says Armstrong. Equipping the mobile workers with ArcGIS for Mobile would enable them

to update maps in real time using GPS location data to ensure accuracy.

Taking its mobile initiative yet a step further, Corpus also chose to deploy an M2M (machine-to-machine)-based AMR (automated meter reading) solution from Aclara for its gas and water utility workers. “The AMR solution was actually a result of a meter reader that was badly mauled by a pit bull,” explains Armstrong. “That incident drove us to find a better way for the utility workers to read meters.” With the AMR solution, utility workers are able to access real-time meter data from their handheld devices instead of having to go on-site to manually read the meters.

To accommodate these mobile solutions, Corpus had two important choices to make — which mobile devices to use, and what type of connectivity would enable them to communicate. The city chose a combination of mobile devices for field workers including truck-mounted Dell laptops (used across a variety of departments), BlackBerry Curve smartphones (used primarily by field supervisors), and Psion Workabout MX rugged handheld computers (used by utility workers). “There’s no one device that is a good fit across all the mobile crews — different users have different needs,” notes Armstrong. “I wouldn’t suggest a BlackBerry be used on a garbage truck, and at the same time, many field supervisors and inspectors don’t have any need to carry a rugged device.”

When it came to connectivity, Corpus debated between using cellular and installing its own Wi-Fi mesh network. While cellular connectivity would likely be the default solution for many of you reading this, Corpus actually chose to work with Tropos on installing a Wi-Fi network (cellular connectivity charges can be estimated at \$50 per user per month; the cost of Corpus’ Wi-Fi network was \$7.1 million). “The idea of Wi-Fi actually came up when we put out an RFP for the AMR solution,” explains Armstrong. “If it were only going to be used for meter reading, it wouldn’t have been worth the investment. But, we knew there were many other mobile initiatives we could use the Wi-Fi network for, including the mobile work order management and mobile GIS solutions.” Corpus also uses the

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network for video streaming from 50 observation cameras throughout the city, and leverages the network to provide free and paid Wi-Fi hot spots to residents. For voice communication, the city uses Wi-Fi-enabled VoIP (voice over Internet Protocol).

Tackle Your Mobile Deployment One Step At A Time

As I mentioned at the beginning of the article, Corpus has a lot going on when it comes to mobility. So, how did the city tackle the challenge of deploying all of these solutions? One department at a time. Once the Wi-Fi mesh network was up and running (installation took 18 months), Corpus began deploying the combination of mobile solutions described above in each of its departments. The city's IT group held classroom sessions with each crew, which included instructions on the device they would be using, how to access and log in to the Wi-Fi network, and an overview of the mobile application(s) they'd be using. Classroom training was followed by ride-alongs to make sure the mobile workers were comfortable with the device and functionality of the mobile solutions. "We chose the groups sequentially based on where we'd experience the largest ROI [which group's productivity would be increased the most dramatically]," says Armstrong. "But as we went on, the word about the earlier deployments spread and we ended up with people knocking on our door asking if they were next." As you can imagine, with the number of projects Corpus has going, the initiative has been years in the making. The plan was conceived around 2003, and has been an ongoing project since.

Mobility Transforms Operations

With the centralized call center and Maximo in place, Corpus benefitted from consistency among departments. This consistency was crucial, because without it, taking the operation mobile would only have created further chaos. Instead, extending Maximo to the field enables jobs to be dispatched to crews via their mobile devices, eliminating time-consuming calls back and forth between mobile workers and dispatch. This not only increases the productivity of the workers in the field, but enables them to respond more quickly to resident needs. Corpus is using another technology, an application called CitySourced from Freedom Speaks, to help streamline problem identification. The CitySourced app, promoted to residents of Corpus via press releases, newspaper, and local TV stations, is available for download on any BlackBerry, Apple, or Android device and enables residents to quickly submit a complaint or request (for more on CitySourced, see sidebar). The CitySourced app is tied in with the Maximo work order management software so

GIS Enables Widespread Mobile Involvement

When the city of Corpus Christi set out to mobilize its GIS (geographic information system), it knew which vendor it would turn to — Esri. The city had been using Esri's ArcGIS desktop software for years, and it was a natural progression to extend the use of that application with ArcGIS for Mobile to its 1,500 mobile workers across 26 departments. ArcGIS for Mobile enables Corpus' mobile workers to capture, update, and analyze geographic information while in the field — a much more effective alternative to the paper map books the workers used before ArcGIS for Mobile.



Residents of Corpus Christi utilize the Esri-enabled CitySourced app to report issues to the city. This information is routed directly to the city's work order management system.

What Corpus didn't see coming at the time it reached out to Esri was the introduction of an application called CitySourced. CitySourced is built on the Esri ArcGIS API (application programming infrastructure) for iOS. The application is touted as a "real-time mobile civic engagement platform." The app, available for download by anyone with an iPhone, BlackBerry, Android, or Windows 7 phone, enables members of the community to identify various issues in the city (such as public safety issues, graffiti, potholes, water leaks, etc.) and report them immediately using a quick, intuitive UI (user interface). The location data of the issue is recorded along with the request, and residents can easily attach a photo for reference. The CitySourced app enables not only the mobile workers of Corpus, but also its residents, to become users of the GIS technology.

The city of Corpus saw a great opportunity with CitySourced — to tie it in with its IBM Maximo work order management system. When a resident reports an issue, that issue is immediately transferred to Maximo and a work order is automatically created and assigned to the appropriate crew. The app has reduced the time that call center workers spend on the phone with city residents while enabling crews to respond faster to the needs of the city. For more information on Esri, visit www.esri.com, and for more information on CitySourced, visit www.citysourced.com.

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that when an issue or request is submitted via CitySourced, a work order is created automatically.

When a worker in the field completes a job, the work order can now be closed on-site instead of that worker taking notes and closing the work order later from a desk-top. This speeds up the process, and also improves the accuracy of the data gathered. ArcGIS for Mobile is tied in with Maximo, so crews no longer need to carry outdated map books, and each work order is time-stamped with location data. Further, now that mobile workers are accessing and updating maps in real time in the field, the maps are much more accurate. “The crews now have the most accurate and up-to-date data possible,” says Armstrong. “More importantly, they can update the maps from the field. Rather than writing questionably accurate notes on paper to take them back and have someone re-enter all the data, they can update while they’re standing there, in real time. This gives us much more accurate information about the items we have in the field.”

This data has enabled Corpus to set key performance indicators (KPIs) for various tasks throughout each department. For instance, the target for a pothole repair is within three days of receiving the report. If it takes more than that, the city can look into the reasons behind the delay (i.e. rain, crew issue, etc.) to determine next actions. “Since we’ve brought the back office functionality to the field, it’s amazing the change we’ve seen — how much more quickly we can identify a problem and get to the precise location without ever making a phone call or stopping in the office to pick up a stack of work orders,” says Armstrong. “But not only are we getting the work done more quickly, we’re collecting a tremendous amount of data. The GIS data we’ve collected lets us predict geographically where we’ll need resources.” For instance, if over the course of a six-month period Corpus gets 100 calls from a subdivision about water leaks, the city can know it will likely need more attention in that area.

While each department is at varying stages of calculating the benefits the mobile initiative has had on productivity, utility workers are an example of the positive impact the project has had. Before the mobile initiative, the average number of work orders a crew member would close per day was 11; now that number is as many as 18, an increase of more than 63%. This field productivity increase is on top of the fact that with the AMR solution in place, more than 140,000 water and gas meters are now read daily remotely. Corpus is currently

evaluating the increasingly popular tablet PC form factor to determine what role the devices may play in the city’s future. “I’m a big fan of the iPad, personally. That’s more for administrative people at this point, but there’s plenty of other options out there,” says Armstrong. “Maybe a tablet with a more rugged build will replace the laptops that are currently mounted in trucks. I think the tablet form factor provides more ease of use for our field workers, and we’re always looking for ways to innovate.” With all that Corpus Christi has done, I think that’s an understatement. ●



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