Kansas City Int'l Test Drives Asset Management Software in Maintenance Facility

BY KRISTIN VANDERHEY SHAW

In November 2017, local residents voted in favor of building a new terminal at Kansas City International Airport (MCI), with a resounding 75% saying yes to the project. The terminal is scheduled to open at the end of 2023 on the site of the now-closed Terminal A. In the interim, the airport is deploying new asset management software in a recently completed maintenance facility, so the technology will be ready to use in the new terminal when it is built.

IAN REDHEAD

Ian Redhead, deputy director of the Kansas City Missouri Aviation Department, gathered information about the value of such systems from colleagues at various conferences. He liked the idea of having the ability to monitor and manage the full lifecycle of MCI's enterprise assets, such as facilities, communications, transportation, production and infrastructure. As the plan for a new maintenance facility took shape, Redhead seized the opportunity to pilot an asset management program on a smaller scale before using it at the new terminal.

Redhead asked members of the Airports Council International – North America, Operations and Technical Affairs Committee what they were using for asset management software, and the answer was Maximo, an enterprise-level computerized maintenance management system from IBM. With the power of the Internet of Things behind it, Maximo provides users with real-time visibility of data on people, places and things that directly communicate with the software. That struck a chord with Redhead.

Leading-edge Initiative

"It's not the easiest software package to use, but it has the most horsepower," reports Redhead. And horsepower is exactly what the airport needed, especially as it began to unravel all the data it would need for a successful software integration.

When designing projects, airports rely on their partners to create and present plans via BIM (Building Information Modeling), an intelligent 3D model-based process that helps architecture, engineering and construction companies efficiently plan, design, construct and manage buildings and infrastructure. Redhead sought a consultant willing to work with the airport to not only use Maximo, but to integrate Revit BIM software as well. Redhead discovered that although Revit has been used at airports for years, most had not been using it for this purpose.

KANSAS CITY AVIATION DEPARTMENT

FACTS&FIGURES

Project: Asset Management Program

Location: Kansas City Int'l Airport

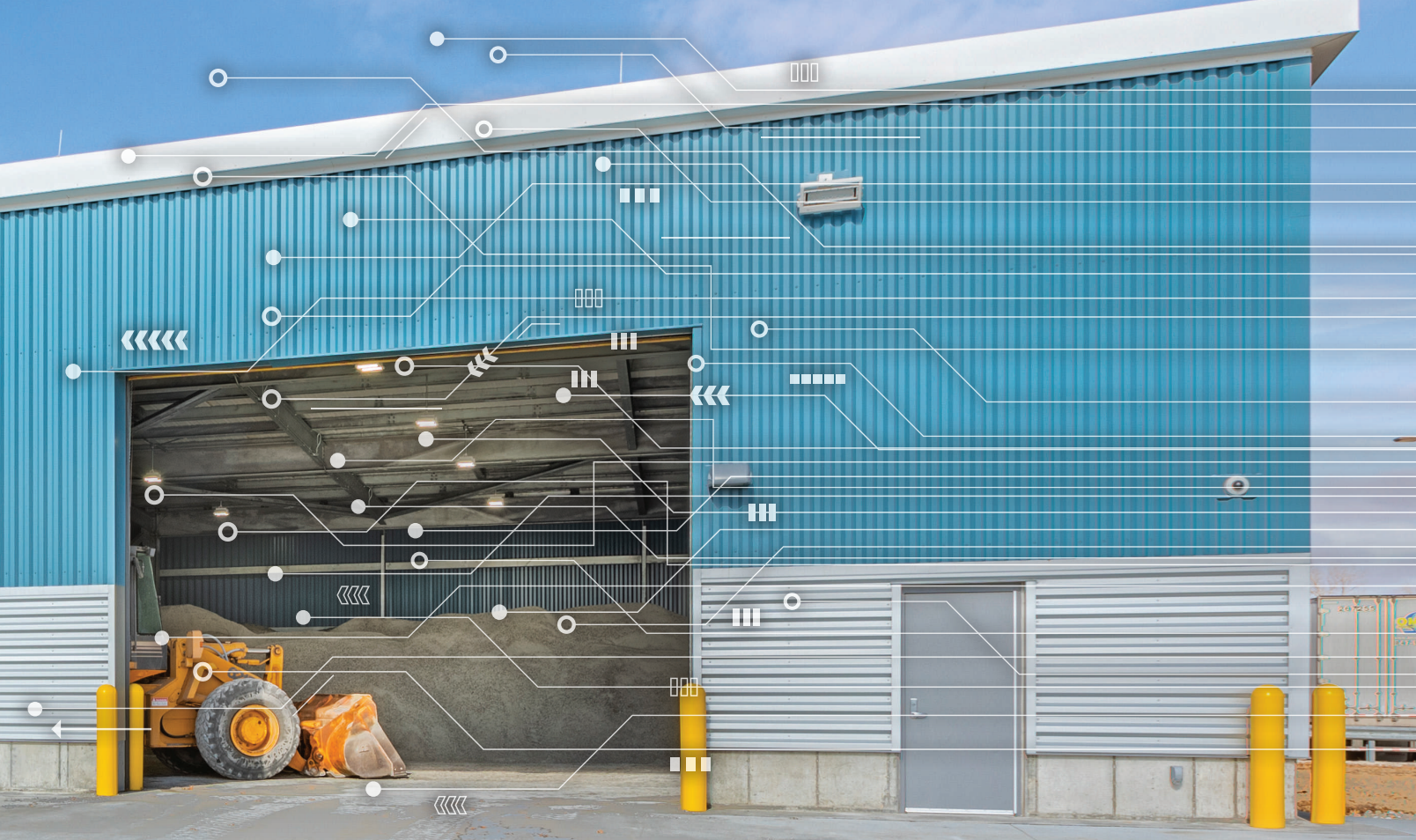
Architecture & Design: Burns & McDonnell

Maximo Implementation & Data Integration: Electronic Data Inc.

Scheduled Completion: 1st quarter 2019

Key Benefits: Monitor & manage full lifecycle of enterprise assets, such as facilities, communications, transportation, production & infrastructure

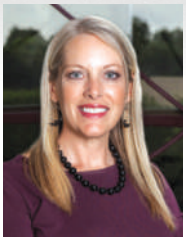
Of Note: Airport is deploying software in maintenance facility to ready for future deployment in new terminal



"I didn't realize how bleeding edge I was going to be," he laughs. "I found out that not a lot of people had integrated Revit into Maximo in this way."

The airport hired Burns & McDonnell to pilot the asset management program for the maintenance facility building. The strategy is to test the process and extract best practices before rolling it out for the larger terminal project.

"It's an innovative approach to implement asset management at the very beginning," says Burns & McDonnell Project Manager Wendy Hageman. "It was easier to incorporate the elements of the building the airport wanted to track, instead of trying to address it after the fact."



WENDY HAGEMAN

Redhead agrees, noting that asset management is often an afterthought. "Until a few years ago, airports weren't really managing assets; they were running a piece of equipment until it failed," he says. "We wanted to better manage our assets, and the best way to do that is through an asset management tool. You can track exactly where your assets are and how they're performing."

Tracking the performance and establishing maintenance timeframes for assets such as roofs, water heaters and heating/ventilation/air conditioning systems helps airports stay ahead and prevent emergencies, Hageman says. Much like the sticker that oil change facilities place on your vehicle windshield to remind you when to return for service, asset management software alerts airport staff to facility maintenance milestones.

The software is also designed to improve response for urgent maintenance needs.

"The benefit is saving time," Hageman explains. "On the mobile app, a maintenance worker can report a broken faucet in a restroom. He can submit the work order on his mobile device from the restroom, and then the equipment is ordered and can be there that afternoon. As a result, that faucet is fixed in half the time."

Critical Prep

For airports not using asset management software, maintenance crews might have to go investigate a broken asset, travel back to an office to pull up details on a computer, look up the part number on a different site, and then order it. With MCI's new system, managers receive alerts that let them know when maintenance is due.

VICKY BORCHERS

Before mobile access is established, however, data must be assembled and strategic plans set for every asset that will be covered. That includes establishing a naming system for sites, rooms and assets for clear labeling. Vicky Borchers, BIM project manager at Burns & McDonnell, says the heavy lifting needed on the front end makes a strong case for filling a role like hers to manage all the moving parts during design and construction.

"Historically, all of the plans are packaged up in three-ring binders or some digital folder structure. In this case, the airport wanted that handoff to be more organized in a way they could receive it and not have to reshuffle it for Maximo," says Borchers. "If you have a system in place and enact it during construction, you won't have to worry about arriving at the handoff and not knowing what to do. A lot of clients will literally spend years reshuffling that information so they can use it down the road."


JOSEPH MAHAZ

Burns & McDonnell brought in Electronic Data Inc. (EDI), an information technology subcontractor from Florida, for the large-scale Maximo implementation, data integration and migration of data from the BIM model to Maximo. The EDI team oversaw the process, including strategy development, testing and staff training. Technicians completed test migrations of data and attributes to ensure everything aligned and mapped properly for the airport. Joseph Mahaz, the company's chief executive officer, says that it's important to perform "just in time" training shortly before testing and go-live so the staff understands the procedures and system functionality as soon as the system is fully live.

"As you work through Agile sprints and develop different aspects of Maximo, you can move them into testing and make sure each is working properly," Mahaz says. "Eventually, what you're doing is building test scripts for the customer so that after everything is configured accurately, you can train individuals. Test scripts are the guide to make sure everything is working correctly."

If issues arise during configuration or user acceptance testing, they are fixed and tested again. Once everything tests properly, the process moves into the training phase, with materials such as test scripts based on the results.

"There's a lot that goes into how to organize this information so that when the system is turned over to the airport, it's useful from day one," says Borchers. "The goal is a fully-functioning asset management."

No Digital Garbage

Borchers emphasizes the importance of starting with organized data. "If the data is not set up properly, it would be as if the contractor puts all of the operations and maintenance information into a dumpster and hands it over that way. You don't want a digital version of a dumpster; it makes life easier for the contractor but is not useful for the airport."

In contrast, a computerized maintenance management system like MCI's acts more like a data funnel. All data is organized and aligned so the airport team can add and delete information as needed each step of the way. The big gap, says Borchers, is the specificity of data sets. If users request a certain level of detail that doesn't match the Construction Operations Building Information Exchange (COBie) data filing, they'll get the least common denominator of data, which requires more manual manipulation.

COBie is an international standard for managed asset information including space and equipment. It is closely associated with BIM approaches to design, construction and management of built assets and helps capture and record project data including equipment lists, product data sheets, warranties, spare parts lists and preventive maintenance schedules.

Based on the results of data testing at MCI to this point, Mahaz advises other airports considering similar projects to be very sensitive to pre-testing early in the process and to build a standard model for extracting data.

"If the data is not very specific for each department, once the model is delivered, there will be data sets pertinent to one department but not another. You have to understand the requirements and bring everyone to the table to ensure it matches rather than going through a manual data population so the data will map easily," he explains.

Redhead understands that the transfer of data is extremely important. "You could make simple mistakes that screw up the data; it's crucial to have it in a format that is usable to you."

In terms of process and communication, Redhead and Mahaz agree that involving all stakeholders from the inception of the project is key. If everyone's not at the table helping develop the standard, Mahaz says someone could get shortchanged, and the team would have to supplement the data set with manual processing. Incorporating all potential needs at the airport saves time on the back end, he adds.

Redhead says, "If it hadn't been for the dedication and coordination of our department heads along with Burns & McDonnell and EDI, we wouldn't be where we are now."

The idea, he explains, is for this project to iron out any wrinkles before rolling out asset management in the new terminal, which is a much larger project.

"We knew this had to be scalable for the new terminal," says Hageman. "We needed to be able to create the system without having to recreate it all over again, and we had to be conscientious that the data sets were set up properly. The standards had to be such that if it were one room or a whole terminal, it could be scaled."

The most important aspect of this project, Hageman says, is finding a test case such as a small paving project that allows the team to pilot the process from beginning to end and see how the whole cycle works. Then, the airport can tweak and modify for the larger project.

"A pilot is a great way to mitigate your risk when you're not sure what you're getting into," says Redhead. "Realistically, I didn't know the magnitude of what we were biting off when we started this process; I thought the science of this was further along. I don't regret where we are or how and why we are doing what we're doing, because I believe it will pay off significantly. The pilot will help us look at real-time data and improve our efficiency before we begin the terminal project."

Wave of the Future?

The Burns & McDonnell team sees computerized maintenance management systems as a trend that airports will embrace because it increases efficiency overall. Moreover, the team applauds MCI for taking steps to embrace innovation and change. While making the leap from BIM to computerized asset management programs is still in progress for many airports, they're discovering new ways to link the model to the physical environment and use it as a 3D image of facility-wide data. Understanding implicitly how data is organized—and to what level of integration and detail—is part of the change management process, says Borchers. With national infrastructure needs projected to increase exponentially through 2021, the opportunity for new construction is vast.

"If you look at the lifecycle of current airport facilities in North America, many are 40+ years old," observes Redhead. "If you have the chance to add asset management as you renew facilities, it might be negligent to not consider it. I don't think I'm being harsh. I think it really is a tool that can provide significant cost savings in the long run."