



U.S. Department of Transportation
Federal Transit Administration

**Transit Asset Management
In-House Tools to Support TAM Webinar Transcript**

November 20, 2019

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Office of Budget and Policy
Federal Transit Administration
U.S. Department of Transportation

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Introduction

Alexandra Galanti: Hello, everyone. Welcome to our webinar broadcast this afternoon for in-house tools for TAM which is another offering in our TAM webinar series.

My name is Alexandra Galanti. I help manage FTA's Transit Asset Management program. I'm filling in today for Mshadoni Smith.

Our first speaker today will be Thomas Humphrey. He is the project director of asset management in Minneapolis.

Then we'll have Sreeparna Mitra in the public transit bureau of Iowa DOT and her associate, Joseph Drahos. They'll be talking about tools they developed in house to help them with asset management.

Before we begin the presentation, I want to mention a couple of things happening over at FTA. If you haven't visited FTA's TAM website recently, we made some updates. So feel free to check back.

Also, stay tuned for the next edition of TAMNews which will be coming out in the next week or two and will include some additional resources and announcements.

So without further ado, I'll turn it over to Thomas Humphrey with Metro Transit. Tom?

Thomas Humphrey

Thomas Humphrey: Good afternoon. My name is Thomas Humphrey. I'm the project director for asset management for Metro Transit in Minneapolis and St. Paul and here today to talk about creating a sustainable asset condition program within the overall transit asset management program.

So first, I'd like to state the obvious. Of course transit asset management really prioritizes how we are delivering safe reliable service. We provide our value to our customers. Of course that we're fiscally responsible with all of the assets we're responsible for. There are many pieces to the transit asset management puzzle like the registry, level of service, criticality, capital planning aspects.

Today we're really focusing in on asset condition. So the situation we have to manage is a huge volume of data that is relative to condition and it's dynamic, it's ever changing.

There is a large amount of data inflow such as asset condition data, defects, time to perform assessments of the assets and where they're located.

Of course, the data outflow to the people doing this work with precision consistent instructions, job aids where needed, and employee feedback. And this all of course impacts the operation.

I feel our most valuable asset is our employees. We have to have a workforce that has the required knowledge, skills and abilities to do the work we need them to do, provide them

technical training that trains the workforce to meet the challenges of today's complex asset design.

We need to provide them precision processes to assist them with their work and provide on-demand job aids so that if there are questions when they're doing this type of work, that they have access to it. And also provide a means for employees to provide feedback. Provide periodic QA and provide a system that is intuitive, user friendly and paperless.

I'd like to say that if it's simple on the outside, it's going to be complicated on the inside. E-process management is no different.

So with this, I'll dive into screen shots of the web pages that we use for this process. This is the opening web page for an employee coming in.

And so off to the right here, you can see there is a warehouse selection. The default for that is the employee's home warehouse, but they are able to select others if there is a need to do so. And that each block within the matrix provides direct access to various processes.

When you click on the block, it brings you to a dynamic list that's generated out of our ERP system. It's sorted in ascending sort order with the most due at the top. There is a search function if they're doing an asset auto sequence for whatever reason. Especially ones located out away in the field so they're able to access that information easily.

The system also provides them access to other asset information such as active work requests which are deferred -- defects that need to be managed and work orders that are currently active as well as a history of the last 30 days so that employees that are doing these type of asset evaluations are able to see all of the information that pertains to it that's relevant to that.

When you click in on a certain asset, it then brings you to a section that has all of the various sections of the process. You can see on the top right, there is a clock-in feature so that when an employee clocks in, we're now able to track their time so we understand how long it takes to do these processes. This will really help us when we're budgeting for a full-time equivalent employees to do this work.

When you click in on a line, you're able to now access precision instructions for them to be able to do the work. There is also a link to job aids so I can have PDF files and user manuals. I can also provide videos and other training media so that employees are able to access that if they need -- if they have questions on how to perform any type of a process.

This also accounts for the ability to log defects. So three things are required when you are going to notate a defect. You have to provide the defect text, you have to provide the priority, and then you have to save the record.

But you're also able to take pictures of it with your mobile tablet device. They say a picture is worth a thousand words and having this will be especially invaluable talking about the exterior condition of things such as buses or other rolling stock.

The comments feature, we feel is critical so that employees that are doing these evaluations in the field are able to provide other non-defect commentary. That really helps us establish a flow

between the employee and the people that are developing the processes to keep these relevant.

The system also allows for logging measurement data. So we're able to measure anything, quarts, gallons, volts, whatever the unit of measure is. There is a configuration table in the background that notates what the unit of measurement is as well as the valid range. And when you select the validate button, it compares it to the config table and anything out of spec gets logged as a defect.

Also if I have a defect found on a previous evaluation, it hasn't been repaired yet, shows up in the body of the text so that we're able to continue to make the data that we have on assets relevant and accurate.

At the end, when they're all done, the employee is then able to submit this to the supervisor so the supervisor knows that that process is completed and can begin the process of reviewing that information for approval.

So we do have a supervisor screen that allows them to monitor the progress of employees and also give them the opportunity to provide a final editing of the information that was entered by the employee. They also approve all the defects so this provides awareness of the management of what may need to be acted on immediately.

There is a lot of benefits to the E-process management system. It works with various types of assets such as equipment. Works with rolling stock. Infrastructure and facilities and fixed guideway elements are all able to be managed with this system.

Other benefits of E-process management is it provides efficient business process. It's a web-based automated system by department. It streamlines the work order process from start to finish. It's paperless and allows for instant access to current and historical data from anywhere that has a terminal that's connected to the system.

It tracks employee time, and it also tracks who the person was, where they were at the date/time they were working on this line as well as the location of each line. Of course now measurements and observation text are now data for future analytics of asset decay curves.

It also documents asset condition and defects. Asset condition is able to be tracked. Real-time decision making can be made. Decay curves can be more accurately determined. Defects that are found can be prioritized and stored in work request. The work request lifecycle is completed when you make a work order. If an active work request is not repaired, it shows up on the next PM for validation.

There is also a process history that's maintained within the system. So the system knows when a process was created, if an instruction changes, the system retains the change history and allows for reports to display current and historical process text.

This is especially important when processes change and you have a system -- processes completed previously that may have had some, you know, significant changes to it. It keeps a good audit trail of what we're expecting our employees to do at any given point in time.

There is of course the job aids piece. The job aids allow for line by line job aid with multiple media formats, Adobe files, JPEGs, videos and provides precision information to cope with more complicated asset systems and the challenges presented by staff turnover, which I know for Metro Transit is a significant issue. Finding people that are technically adept, training them and things are complex and this gives them a leg up on that.

There is also a quality assurance piece. This allows for simplified QA checks. I know we struggled with doing effective QA just due to the volume of assets we maintain and employees over at the systems. We are able to skinny this down where they're literally checking five processes per line.

We will be developing a randomized algorithm to make sure we're checking everybody on everything over time. If there is a failed QA, we know where to focus our training or employee management. This develops a systematic means of insuring process health and employee performance.

So the benefits of this to transit really are now quality condition data for transit asset management for the employees' precision instructions so we're able to consistently do these processes, and that we provide them job aids so they can do their work and provide the robust and systematic QA.

So that's the end of my presentation.

I'd like to give a special shout out to key staff who contributed to this initiative of Metro Transit. That would be applications developer Scott Weiss, fleet service supervisor Steve Kaari, and of course project manager Carolyn Harris. Without their invaluable help, we wouldn't be as far along as we are.

With that, thank you.

Alexandra Galanti: Great. Thanks so much, Tom. I want to remind all the participants that the chat pod is there to submit questions that we'll take at the end of both presentations. I've seen some questions there already. Feel free to submit more.

With that, I'll turn it over to Sree Mitra and Joe Drahos from Iowa DOT to talk about their in-house tools they developed to support asset management. Sree?

Sreeparna Mitra & Joseph Drahos

Sreeparna Mitra: Hello. There we go. See my slides come up now.

Good afternoon. I'm Sree Mitra from the Public Transit Bureau at the Iowa DOT. With me is Joe Drahos from our Systems Planning Office. Joe is the person who developed the app that we'll be talking about today, and he will co-present with me during this webinar.

To start off, I'd like to talk a little bit about how we are organized in Iowa.

So this map basically shows you where all our transit agencies are located across the state. The blue icons depict our larger urban systems that have populations of over 50,000. And then the

green icons are showing you where our smaller urban systems are. These are also fixed route systems, but they have smaller populations of less than 50,000.

Then the -- excuse me. That was the yellow icons. Sorry.

And then the green icons are the regional systems that primarily serve our rural counties and our demand response in nature.

For our transit asset management plan, our group plan included the small urbans and the regional systems only. Our 12 larger urban systems did their own asset management plans.

Okay. So when we started -- when the TAM rules were published, we realized we had a pretty good system in place already for vehicles that we already managed centrally here at the DOT. We had lots of data available to have a pretty robust asset management for rolling stock.

However, we didn't have anything significant in place for facility assessments and really had to start with a blank sheet of paper on how to do this.

I basically had a wish list going. My vision was to have a facility assessment system that would be easy to use, and enable somebody to enter data as they walk through the facility doing the assessments. Preferably paperless so we wouldn't have a lot of duplication in coming back to the office and entering the data. And minimize extra work following the post-assessment process.

We wanted to be consistent with FTA guidance and incorporate the term scale and if possible, have scoring consistency across the state. Those were the main features that we were looking for in developing a good facility condition assessment system.

Prior to development of this app, we did collect all the NTD required facility data from the transit agencies such as address, square footage, the type of facility it was, et cetera. So that we could pre-load all this information into the app so there wouldn't be any typing required to these types of fields.

So in summer of 2018, we did use our app to do assessments on about 40 buildings using this in-house developed system. It was developed to closely follow the guidance from FTA's TAM facilities performance measure guidebook.

And to have some consistency across the state, we hired an intern that summer to do all the assessments so there would not be any user variation as we did this.

Our larger 5307 agencies that I mentioned did have their own transit asset plan development process, but the DOT did offer to assess their facilities using this app if they so desired. I think about 8 of the 12 larger urban systems did take us up on that offer and have us do their facility assessments as well.

So for the next few slides, we will be going through some screenshots from that app. This works with either iPads or Android tablets. It was developed using Survey123 for ArcGIS.

So when you open up this app on your tablet you'll see a map of your state. In this case it was Iowa. And it shows you where all the transit agencies are located, or rather the transit facilities are located.

And the time that the screenshot was taken, we had done some of our assessments but not completed all of them. So the blue tags tell you which assessments have been completed and submitted. The ones without the icons depict the ones that are left to be done.

You are able to change that base map to a street view, for example, and there are several other options as well. This one allows you to zoom down to the street level or building level and use this as a GPS type of system as well.

And so back to this original map, if you click on one of the icons, you'll see this little pop up box that will say begin new assessment.

At this point, I will turn it over to Joe to walk you through how the app works as the assessor is going through the facility.

Joe?

Joseph Drahos: Thank you, Sree. Yes.

So as she mentioned, we equip the field collector with a tablet. They go out and will be using the -- actually they initially start with the collector app by ESRI. They navigate to one of those black and white transit facilities that we pre-populated. Hit that blue icon that says begin new assessments and that opens up Survey123. The two apps are connected together.

What you're looking at is the Survey123 interface. Some of the information from the point in collector has been pre-populated. So the name of the facility, the region, the street address are already pre-populated in there.

What the collector then can do is review all of this information with the transit facility manager just to make sure everything looks right. A lot of these -- a lot of these pieces of information can be changed with a drop down pick list.

For example, the type of facility, if upon review they note that actually it's just an administrative facility and not a maintenance facility, they can select that through a drop down menu and change it. We try to standardize and stream line the interface as much as possible.

Likewise with things like the year or the square footage, we restricted that to only be on numbers that can be inputted so that they can't type in words or letters or special characters like that.

The main part of the assessment is to conduct that condition rating, so what you're looking at is kind of the heart of the app.

So it defaults to having the current date and time of the assessment. The user could change this if they want. You'll see there is a little dropdown arrow. When they select that, a calendar comes up and they'll be able to tap on the screen what day they want to set it to.

The next blank there is the overall condition rating. It starts at zero, and this is actually a read-only blank. This value will change depending on how they answer the different sub-categories there that's indicated with the letters A through I. Some structure shell through electrical and site. Depending on how they answer, that number will change.

So in this example, we're looking at the shell. They hit the little gray arrow next to it. Triangle there. And that either expands or collapses the section as they want. We populated all of the sub-categories with as much reference material from the FTA guidance as we could.

We especially liked having images on what indicates, you know, adequate condition versus good condition and then try to provide all of the language in there describing what all those mean.

Then the field collector would go through and start answering the questions. We broke them out on a sub-question there on a scale of 1 for poor all the way to 5 for excellent. We did put a non-applicable option on there which gets recorded as a value of zero which you can't see on there.

As they answer the questions and apply condition ratings, it starts to update the sub-total that you can see there toward the top of the screen that says 3.5. Depending on how they answer, it will change that. What you don't see is the overall condition rating being dynamically changed as well.

After they answered all the questions within each of the sub-sections, we provide an opportunity for the collector to display any relevant notes or observations and just in an open ended text box as you can see under the sub-structure notes.

Immediately underneath that, you'll see sub-structure photo. They can use the camera on the tablet to take photographs of any deficiencies or conditions that they felt needed to be noted. They can use those -- that notes section to document what they're seeing and observing as well.

There is no restriction on the number of photos either. Really you're just limited on the space by the tablet.

Once they submit the assessment, they can switch back to the collector app and they'll see that blue icon appear on top of the facility icon indicated they -- indicating they submitted the assessment successfully. They can reselect that blue icon and review the information they just submitted, including being able to look at all of the images and photographs they took.

And with that, I'll turn it back over to Sree.

Sreeparna Mitra: Thank you, Joe. So that's basically in a nutshell how the app is working.

Then as assessments are being done in the field, we can see the results in real-time back in the office. So this is a picture of a dashboard. And all those little squares in various shapes of green are what the assessments overall scores were for the various transit systems. So clicking on an icon will pop up the details of the particular assessment.

Here is another dashboard view. In this one, you can see some other information around that map. So at the time the screenshot was taken, we had completed 32 of the 40 building assessments that we were going to complete. So that shows you that that's 80% of the assessments have been completed.

And that little dial at the bottom of the screen shows you that the average for all the facilities done so far in the state was a 3.8. So that was the score overall for the 32 facilities that had been assessed so far.

As time goes on, we can also have all kinds of trending graphs. This particular one just shows the scores for the various agencies. When we do a few more rounds of these kinds of assessments, we can start looking at trends over the years and if there is a particular area that needs more attention and so on.

So there is a lot of good features that we can use in this dashboard app.

This is another view. So the dashboard is dynamic. If we zoom that map to a particular area of the state, for example here we have zoomed in on the northwest part of Iowa, the statistics around that will also change to just depict what is on the map.

This is nine facilities that have been assessed so far out of the ten that we need to do in that area. And it shows the score for just that part of the state. You can look at broadly -- broad sections of the state or particular areas to see if there are features that pop out as you get more granular.

Okay. The Survey123 software can also generate a report. What we did as we completed the apps is generate a report for all the transit managers so they'd have a copy of what the assessment looks like.

That first page just gives a general overall view of how each of the subsections of the facility was scored. Further pages will give details about how components of a subsection were noted. Any notes that the field collector made would also be displayed in this particular detailed version.

For example, under shell, our assessor made a note saying that the -- some parts of the garage doors are rusting. She took a photograph, so on the next page of the report, you can also see all the photographs and that bottom left-hand one shows a little bit of rust on the garage door. You can see exactly what she was noting in her assessment.

So these were very helpful to the transit managers and it provides a good way to reference back and see if conditions are getting worse and need to be -- some resources need to be allocated to fix problems.

More detailed information about this facility condition assessment app can be found in the FTA case study. That is linked over in this slide.

Finally, I thought I'd talk about a few lessons learned while we were doing this. So it was important to do field testing before we went out and did real assessments. This was important to troubleshoot the app and also build in user-friendly features.

For example, maybe the button would work better if it was a certain place. Maybe the font would need to be increased a little bit and things like that. Also any glitches that happened while doing this test assessment give us good -- we could detect problems and fix them before we went out in the field.

Consistency checks prior to the assessment gave us more confidence in the tool reliability. What we mean is we wanted to see if this tool was somewhat user independent. So our intern and I went to one of our test facilities with two tablets with the app loaded on them. And we did independent assessments of that same facility and we compared scores at the end, and we were within .2 of each other.

That gave us some confidence that there was enough guidance on the tool to provide some amount of independence and it wouldn't be so operator dependent.

I give -- I'd like to thank the FTA guidebook for that. That was very helpful because all that guidance was available on the app. So if you're unsure about how to score one, you can pull up the guidance and refer to that and make a better judgment of where the score needed to be.

Also, the combination of apps such as field data collection, application dashboards and all the reporting tools available made it possible to quickly create a robust system of assessing and monitoring facility conditions.

And finally with appropriate in-house expertise and Joe provided us that expertise in-house, we could actually create the systems ourselves without having to turn to third party contractors which would be very expensive.

That's all I have. Here is our contact information if you'd like to follow up with us at any point. We welcome your inquiries.

Thank you very much.

Questions & Answers

Alexandra Galanti: Great. Thank you, Sree and Joe. Appreciate it.

Looks like we have about 28 minutes left in the webinar. So what I'm going to do is pull up the chat with our questions on it. We'll get to hopefully all of them in the time we have. If we don't, I'll share your question with the presenters and try to get an answer to you.

Please be sure to add your question. If we don't get to it during this time, we'll give you a response.

Give me a minute to make sure I can get everyone's questions.

So the first question was from Julio Flores. This is for Tom. What software are you using to manage your assets?

Thomas Humphrey: So today we have an older system. TX Base. We purchased the code in 1996 and it's been highly customized. The software that we demonstrated today was developed in house. It's a .NET application with a SQL server backend.

We intentionally designed this so that if we get a new EAM system or ERP system, that it will function with that. And the Met Council is in the beginning stages of developing an RFP for a new enterprise asset management system. So our hope always was that all of the intellectual property we have within the system for evaluating assets will just be portable over to the next system.

Alexandra Galanti: Great. Thanks, Tom. The second question I believe is also for you. Is this a promo for a specific software system?

Thomas Humphrey: That would be no. This system has been developed over the course of three or four years. Phase one was creating a dynamic database driven process for managing all of the instructions that we have for evaluating assets. And then phase two was the web app. Phase three was the job aid. Phase four was the quality assurance piece. This is not available publicly.

Alexandra Galanti: Great. Thanks. The next question is, is this a pass/fail inspection? I didn't see a method for a condition rating. That's from Martin Batistelli.

Thomas Humphrey: That's something we're going to be working towards. The first thing we worked on was being able to provide instructions for how to evaluate things. Our intent is to continue to evolve this so it weaves in asset condition value aspects. Then we'd get these real-time with employees that are evaluating these assets.

Alexandra Galanti: Great. Thank you. The next question that I see is, is the software adaptable for annual inspections?

Thomas Humphrey: The answer is yes. It's adaptable for any type of asset. Fixed guideway, rolling stock, facilities, infrastructure. And any inspection level from, you know, ten-day inspections to two or five-year inspections.

Alexandra Galanti: Great, and from Randy Lamm, what is the vendor of the Metro system?

Thomas Humphrey: The vendor of our ERP system is TX Base. There is no vendor for the E-process management tool as that was developed in-house.

Alexandra Galanti: Sorry about that. What was the completeness of the asset information that went into the tool?

Thomas Humphrey: So that is something that's being developed over time. So for our bus maintenance department, I think this is true for most agencies. They had a high level of transit asset management maturity. Very defined processes. So very much complete information set for that.

And for other systems, such as our LRVs and commuter rails, today they're still using the Word documents and they're going to be transitioning over to this system over time.

And to answer the middle part of the question, how long did it take to develop the tool? Probably in total, a year or so. And that included a lot of testing stuff. But in our case, it was kind of drawn out over time as we really didn't have dedicated staff working out continuously.

The staff resources to support the project, we had one backend designer. This person did all the table structure and designs. Procedures were created. Then we had a .NET person write on a framework that we purchased for the purposes of the project.

Alexandra Galanti: Great. Thank you. The next question from David Burrows, I think we have talked about this. It's what was the Metro Transit tool, was it commercially available software or was it a custom developed application? Is there anything you want to add to that, Tom?

Thomas Humphrey: Well, no. I know that there are commercially available softwares that do components of this. We were very interested in having the whole method to evaluate assets with staff in the field today. Then we weave into that asset condition aspects to come back with that asset condition rating.

Alexandra Galanti: Great. Thank you. I think this next question from Richard White might be for Sree and Joe. Isn't most fleet operations predicated on cost per mile per month or year?

Sreeparna Mitra: For fleet, we have a separate system. This particular app was designed only for facility assessments. We do have -- we base our fleet replacement on miles and age of vehicles. We have a formula-based system that does that.

Alexandra Galanti: Thank you. From Tina Ignat, for Iowa DOT, is there any link between CMMS and Survey123?

Joseph Drahos: I'm not familiar with the term CMMS. I'll assume that maybe that's the source of data of the facilities. There is a link between the facilities and then the assessment forms done in Survey123. There is a relationship class that maintains that connection so that we can do as many assessments connected back to that facility point as we want. It will be nice if we want to go back and do another assessment and compare multiple years together and see how they're changing.

Alexandra Galanti: So Tina clarified that CMMS stands for computerized maintenance management system.

Sreeparna Mitra: Tina, is this a commercially available product? We are not familiar with it.

Alexandra Galanti: I'll move on to the next one while she replies. Who is the software vendor for this application? From Chad Cumberworth.

Joseph Drahos: ESRI developed the collector app and Survey123 and we configured it and set it up to collect on the facilities.

Alexandra Galanti: Great. Then from Julio Flores, similar question. For Iowa DOT, who did you use to help develop your app?

Joseph Drahos: The actual setup, beyond the FTA guidance, we just did it ourselves.

Sreeparna Mitra: Right. It was all Joe. (Laughs)

Joseph Drahos: I'm just a planner. Anybody can do this. I'd like to add that.

Alexandra Galanti: Great. So the next question is for FTA. Why hasn't FTA developed a standard software that can work with multiple database systems, such as Maximo, to consolidate the data? Something open source would be great.

I am going to let Mshadoni Smith answer that question at a later date since I'm not able to.

Randy Lamm asks, does the app recommend projects that need to be done? That will be for Iowa DOT.

Sreeparna Mitra: No. It does not do that at this time. It does give you a score, so indirectly if the score falls below a three, that means there needs to be resources allocated. But it doesn't directly report specific recommendations like that.

Alexandra Galanti: It wouldn't prioritize your projects for you.

Sreeparna Mitra: No. It wouldn't do that.

Alexandra Galanti: The next question is from Martin. How does the Iowa collector app aggregate the individual ratings into an overall condition rating for a facility?

Joseph Drahos: That is done by Survey123. As they're answering questions and setting those condition ratings for the different subcomponents, it's automatically calculated a subcomponent score and that's contributing to the overall condition score. Right now it's just a simple average. It does it all automatically.

Alexandra Galanti: Thank you. From Stanley Sun, it seems like everyone has the same problem but using different software. What's the solution? That's a large question. I don't know if the scope of this webinar can fully address. If either of our presenters have any input they want to put in, that would be great. If not, I'll move on to the next question.

Thomas Humphrey: I do think that the software situation is a challenge. It also ties back to having that standardized software so that really all of the information we contribute is easily mapped out to those common themes with the FTA.

And I think in a number of the conferences that I've been a part of, the common theme is that some people expect a software to solve their asset management problems. Of course that's not true. Asset management is more functional and process driven and systematic and a system can assist with that. It doesn't do it for you

And I really do think it's the consolidated groups that have to start asking vendors for the same thing that over time will help guide us into a similar framework.

Alexandra Galanti: Great. Thanks, Tom. From Julio Flores. For Iowa DOT, how many assets are you managing?

Sreeparna Mitra: We actually don't manage the assets as much as our transit systems that do. We provide guidance. We don't have any service the DOT itself provides itself. The transit systems manage their assets and so it kind of depends. We -- as far as doing the assessments for this particular TAM program, we had about 40 buildings that our systems had capital responsibility for so we did an assessment based on which systems were responsible for those resources.

Alexandra Galanti: The Iowa DOT is a group plan sponsor --

Sreeparna Mitra: Yes. A group plan sponsor for 23 subrecipient agencies. They manage their own assets. For this particular case, we did 40 buildings.

Alexandra Galanti: Great. Thanks. For Tom of Metro, from Roland Cordero, is your ERP in addition to a fleet maintenance software like RTA to record work orders and fleet repair history?

Thomas Humphrey: So our ERP system is our fleet maintenance software at this time. And it manages our work orders. Our PM intervals. Retains our history. And I'm happy to say that this system correlates all employee time to specific work orders so we know with great precision where our labor force is going. My fear is future systems may not have that functionality. We're just tipping our toe into the pool of enterprise asset management systems in the next several years.

Alexandra Galanti: Thanks, Tom. So I'm going to go to Raphael's question first and then to Tina's rephrased question. Does the E-management prevent validation if data is not entered into a measurement field? This should be for Iowa DOT.

Sreeparna Mitra: Yes. If the data does have conditions on it. So if it's invalid data and there are multiple numbers entered and doesn't look like a date, it will not accept it. These are mandatory fields. If anything is left blank, it won't accept it. It would not allow the collector to submit.

Alexandra Galanti: Thanks. This looks like it will be our last question. Feel free to get those in if you haven't. From Tina, is Survey123 connected to a maintenance management system or is it stand alone?

Joseph Drahos: It's stand alone.

Alexandra Galanti: Thanks. I see one more question here. From Kimberly. Is this something that should be taken up by an MPO or by the DOT? We're a very small transit system and I'm concerned something like this would not be cost effective for us. Our city doesn't have an ERP system and they're just now gathering data to create a citywide system but our transit agency doesn't really have input.

Do either of our presenter have opinions about that question?

Sreeparna Mitra: I'd expect most DOTs probably have some kind of ESRI software in place already. So if they have the GIS expertise, that would be a way to -- it would be good to explore with the DOT if they can provide this. I know that we had presented a similar webinar last year. And a few DOTs did reach out to us to see if they could develop a similar app. I'd say talk to your DOT and see if it's possible.

Thomas Humphrey: And this is Tom. So yeah. If you don't have an ERP system, that's a problem. But the ESRI system does have a lot of functionality in regards to attributes. If you don't have some system to track everything currently, I think the ESRI system does a nice job of allowing for that attribute information which can be linked up to the collector app.

Alexandra Galanti: From FTA, in order to meet the requirements of the TAM rule, systems like the ones that Iowa DOT and Metro Transit are using are not like the be all end all of those things.

If you're a small transit agency, maybe you don't need a huge software system to do the thorough and consistent condition assessments on your facilities. Maybe you'll need something less than that. These are examples of ways that agencies have used to help them manage their assets. They might manage a different number of assets than your agency does or they may manage them in a different way.

Great. If there is no more questions, I think we'll go ahead and close the webinar. So again, if any come in on the end after we're able to answer them, we'll get you answers for those.

So everyone, thank you so much. A special thank you to Tom, Sree and Joe for extremely useful presentations today.

This webinar will be posted on our FTA YouTube page and available on our outreach page on the FTA TAM website.

So thank you so much, everyone. Have a great afternoon. We'll see you at the next TAM webinar.

Thomas Humphrey: Thank you.

Sreeparna Mitra: Thank you.

Joseph Drahos: Thanks.