**Andrew**: Okay. Good afternoon, everybody. I'm going to give everyone a little bit time to get logged in. We'll get started in just a moment. Okay. All right. Good afternoon, everybody. Welcome to our webinar on our Promising Practices Guidebook. And we're very excited to be able to share some great practices from around the industry.

This is one we've been looking forward to for a really long time. It's easy to talk about theory, but now that we have some real practical information and presenters on the ground deployments of transit technology. This is a great opportunity to be able to share that with everyone and to give some information to walk away with. And so, I'm Andrew Carpenter.

I'm the director of the National Center for Applied Transit Technology. And we are a Technical Assistance Center. We have a cooperative agreement with the Federal Transit Administration. And we help small urban, rural, and tribal transit agencies with understanding, navigating, wading through, and learning how to implement transit technologies.

And this is across the spectrum of technology. So, learning about something as sunshiny as automated vehicle location, to the more leading edge. We don't quite want to be on cutting edge, but leading-edge technologies such as micro transit, and autonomous vehicles.

So, we have a series of webinars that we have done so far this year, which include mobility as a service, autonomous vehicles, GTFS flex, open data, open software. And so, we serve as a No Wrong Door type of Technical Assistance Center. So, we want you to come to us with any questions, any topics that you would like to learn more about, and we are here to help you with it.

And so, these webinars and these guidebooks that we're putting together are part of that suite of information services that we provide. And so, Chris Zeilinger, who also works with me at NCAT. He has been working hard on this promising practice guidebook. And so, I will pass it over to Chris to introduce this exciting new product that we have.

**Chris**: Right. Well, thank you, Andrew. And it's a pleasure to have folks on this webinar with us today. I will say a couple things. And then, in classic inside the DC beltway fashion, even though I'm working from outside the Beltway at the moment, I will keep passing the baton off to the real presenters today.

But yes, I'm with community transportation Association, where NCAT is housed. And a couple things I will just mention as we're getting started. One is, as Andrew mentioned, this Promising Practices Guide, there is going to be a document where we're making reference to it in this presentation today. It is prepared under a cooperative agreement with the Federal Transit Administration. I've got a lot of lawyers in my family.

I am not a lawyer but being around them kind of makes me want to say a thing or two. One is that both in today's presentation and in the final published guidebook that will be on the NCAT website soon. We might be making reference to particular companies’ products or things like that, but that is not an endorsement or urge to go out and buy what they're selling. It is simply if we mention a trade name or product, it's just to keep the conversation flowing conveniently as opposed to trying to tie ourselves into verbal knots around describing certain activities.

Similarly, this is a promising practices guidebook, and we'll be talking about a few promising practices. Even though we use Federal Transit Administration's funds to research and prepare these materials, nothing that we're going to be talking about today is to be taken in any way as a recommendation or policy statement by the federal government.

These are simply what your peers across the country a few of them are doing that we thought was really neat. And somehow coming up with the really neat guidebook doesn't quite sound quite right for deliverable product, although maybe that's what we'll be doing next in our lives. Anyway, I will be doing a couple of things on this webinar.

Mostly relatively quiet most of the time because I want you to hear from Reinaldo from Foursquare ITP, who really did most of the work, and points together along with his colleagues and other members of their staff. And we've got some, quote, real people to help describe some of these practices from their own instances.

I will point out a couple of things. One is if you're purely procedural that every participant is being kept muted, and will be kept muted, unless you find your way to hack yourself into noisemaking. And if you have questions, please use the Q&A function that you should see somewhere on your zoom screen. My job is to monitor those.

For the most part, I will be reading from your questions and fielding some answers from our presenters at the end of the presentation, unless you happen to pose the questions really in the heat of the moment of a particular slide. Like what's that about? And it seems like we really would be best to really address that.

So, I'll be monitoring the Q&A button on the screen to see what you're posting there. So, please post your questions there. If time runs out, I think you will know where to find us if you see our names written out somewhere on the speakers view everyone on the CTA staff, which is Andrew and myself. Our emails are our last name at CTA.org so you can always follow up with an email after the fact if you need to. So, those are the main things.

This work was, as I said, done under contract to the NCAT at CTA by Foursquare, Integrated transportation planning. And Reinaldo was the team lead on that work with some wonderful people from foursquare working with him to reach out and find. We scoured the universe, when I say we, this is Reinaldo and his team.

Scoured the universe, came up with many dozens of interesting practices. And then we look to see which ones actually were not already very well publicized, very well-known, but maybe needed a little bit of extra light to cast to them. Which ones seem to be ones that were not purely one-off things that couldn't be replicated somewhere else. So, we'll be making reference to this guidebook, which is soon to be published and posted on the NCAT website.

We think everything in there is something that a rural, or small urban, or tribal, or other urban, or specialized transportation provider in the US or elsewhere could actually replicate in some way in the in their own circumstance.

So, we have some neat practices. The guidebook has 10 of them. During the course of today's presentation, we've got Alana Shores from Carta and Chattanooga, who will be helping give some life to what that particular promising practice.

Ross MacDonald and Dan Currier from DTrans and Vermont will be adding a little bit of real-life perspective to the government practice that we'll be talking about later on. Josh Powers from Johnson County, Kansas. We'll be talking a little bit, fleshing out some of their flux transit service there, and again to give it some live.

And Reinaldo will be doing most of the talking. I've given the chance to kind of limber up his vocal cords, get a fresh drink to make sure that he's ready to lead us through there. So, Reinaldo, I think what I'll do now is really turn things over to you to kind of keep the ball rolling and share what you've got to share.

**Reinaldo**: Thanks, Chris. I think we can. So, briefly, I'm a senior transportation planner for Foursquare, ITP, and myself and other four folks at Foursquare dedicated a good chunk of our summer to contacting those agencies, and developing this guidebook. So, I think we can move on to the next slide, and we'll briefly present the structure of the presentation today.

So, we're presenting the content of the guidebook in three main sections. The first one will describe the types of promising practices there were showcased today. That will, they're going to be showcased today in the webinar, and that they are included in the guidebook.

We'll briefly locate them in a map, and we'll move to another section where we will introduce each one of those cases. And then we have representatives of three of those cases joining us today.

And we will conclude this, discussing what were four common themes across those promising practices that were identified as key successful, as key to successful adoption of transit technology solutions in those cases.

So, I think we can move on to saying, what is this practice, right? What is this guidebook? Many technology-based innovations in transportation have largely been restricted to large systems or dense urban areas. And then fitting perfectly under endcaps mission to provide small urban, rural, and tribal transit agencies with practical resources that can help them adopt technological solutions. We have this guidebook.

The guidebook called Promising Practice Guidebook technology adoption of technology, transit technology adoption, sorry, is intended to be a resource to small urban, rural, and tribal agencies in understanding, selecting, and otherwise planning to incorporate new technology into service. In the context of this guidebook, a promising practice has worked within at least one organization, and shows promise during its early stages for becoming a recommended practice with long term sustainable impact.

In terms of the types of practice, we can move on to two more slides, and we have the list of eight types of promising practice that we provide and this object that we described, talk about, in this guidebook. So, the guidebook as Chris mentioned before includes 10 profiles categorized under those eight practice types.

Accessibility, alternative fuel, asset management, passenger information in general transit feed specification, GTFS, computer aided dispatch, automatic vehicle location, PVL, fair payment, micro transit, and mobility hubs.

Although those are very broad categories, the practice that we profile details specific examples that sometimes involve new use cases or integration of technologies. We will have one slide that will define each one of those 10. Sorry, those eight practice types, before presenting each one of those 10 practices.

And the following slide, we have a map of North America, where we locate where each practice is. So, the guidebook provides 10 practice across the country across North America, from California to Vermont, from South Carolina to Canada, we have one case outside of the US and Quebec. Of the 10 profiles, nine are individual agencies experienced by one of them is a composite profile, featuring the experience of several agencies.

Profiles include not only tribal, and rural, and small urban transit. But they also have some large urban examples in some large urban context with the potential that we believe has the potential for replication in a smaller context more fitting to its audience. So, I think this is a brief first section of the webinar where we just present the types of practice, and we’ll now dive into those specific, defining the specific types of practices and presenting each one of them.

So, our first practice type is accessibility. Accessibility. Accessible transit options. In fact, many groups of riders, each with their own unique needs that may necessitate different types of accommodations. The transit industry can harness technology to improve access, and ease of use, and inclusion of those populations.

Agencies across the country are experimenting with partnerships with TNCs, transportation network companies, such as Uber or Lyft to provide paratransit target paratransit services at a lower cost, or are using third party software to improve their transit booking or routing systems services, or deciding on demand paratransit services that don't require those advanced booking windows of a day before the trip, for example.

The two cases that we have profiled in our guidebook are the case of CARTA's and the Michigan mobility. So, CARTA's Wayfinding smart travel system. The agency behind is the Chattanooga Area Regional Transportation Authority, CARTA. The location is in Chattanooga, Tennessee, and the context is more of a large urban one. I'm just going to briefly introduce the second one that is the Michigan mobility challenge for transit providers to improve customer service and visually an inhering.

Sorry, for the visually and hearing impaired. So, the agencies involved in this one is Ann Arbor Area Transit Authority, Detroit transportation, Department of Transportation, and the suburban mobility authority for regional transportation. The context of this one is, again, a large one. So, sorry, Andrew, we can go back to CARTA. So, CARTA’s way finders smart travel system.

The promising practice here is a custom customizable app, a mobile application with visual clues, and recorded audio directions to help individuals with intellectual disabilities to travel independently in transit systems. So, CARTA worked with the Tennessee Department of intellectual and developmental disabilities. DIDD.

The city of Chattanooga, and a nonprofit called Orange Grove Center, in addition to enabling smart living technologists who develop the technology. They all formed a public private partnership to help individuals with intellectual disabilities to navigate services. So, CARTA serves the city of Chattanooga, and the surrounding areas.

They have fixed bus transit, paratransit, an electric shuttle. And they also operate the Lookout Mountain incline railway. So, I think I'll talk a little bit about this practice. And I think I should just highlight some key takeaways. And we can move on to having Alana talk a lot a bit more about this.

So, in terms of key takeaways that we thought were important in this case are that partnerships were critical to the development and implementation of this app, including funding from the tech firm, the Tennessee DIDD. And the participation of the Orange Grove center for their clients. In terms of long-term widespread use of this app could move riders from paratransit to fixed route service, which could decrease operating costs.

And in the short term, CARTA invested a significant in terms of another resource related aspect of this practice, is that in the short term, CARTA had to invest significant staff time in developing those routes in the application to help those participants. So, I think I now give the floor to Alana.

**Alana**: Hello, everyone. The main focus on this app is to work with people with intellectual and developmental disabilities, cognitive disabilities. We're still in the very early stages. And we were about two months into actually being able to ride the bus with our very first individual when this pandemic hit.

So, we've kind of had to stop where we were at because of the pandemic. And hopefully soon, this will go away, and we will be able to start back again. But we were still in the very early stages. I'm not really sure what else to say about it.

**Reinaldo**: We might have more questions later in the end, too. But thanks.

**Alana**: Thank you.

**Reinaldo**: So, moving to the next example, under the category of accessibility. The practice type is the Michigan ride paratransit, an application to improve paratransit on demand booking experience. So, the promise practice here is using a web-based booking and trip management platform to create a one click experience for users of the three public transportation systems that incorporate technology. To make it easier for visually and hearing-impaired clients to access their services.

So, after receiving a Michigan mobility challenge grant, the right selected the Phoenix mobility horizon to develop the Connect app, which helps those riders to navigate public transit using this walk-through words. This is a way of mapping the world that has squares, a three by three meters. Their address are just three words.

That makes it easier to communicate where you are using those three words. In terms of key takeaways for this practice are that the Michigan mobility challenge summit provided the forum for the identification of needs through input from a variety of agencies serving for persons with disability and veterans.

As well as from community members directly, from community members directly. That led to scoping the medic to the app. It was a great platform first Copeland this app. So, in addition to this frequent and clear communication between the participants in this development of this app, and vendor, enable issues associated with creating a solution that works for three systems, of course, three different areas.

So, I don't know if I described what are these? I believe I described those crease agencies before when I presented the case three slides ago, but I'm going to repeat those agencies are the Detroit Department of Transportation, and Smart suburban, the suburbs of Detroit. So, I think we can move on to the second type. Oh, yes.

So, we're here now. The type the type is alternative fuels, and interest in alternative fuels options, such as electricity, biofuel hydrogen, and that progress is increasing. The adoption of those fuels can contribute to helping to meet goals of reduction of energy, energy consumption, and decrease greenhouse gas emissions.

Electricity and biofuels have reduced fuel costs for public transportation agencies in general. But specifically for the two cases we just profiled in this guidebook, which are the Blue Lake Rancheria area transit system that uses waste oil to fuel their fleet. The agency is the Blue Lake Rancheria area transit system, and Humboldt County, California.

And it's a federally recognized tribe. The second example that we have here is the Clemson Area Transit, where we've discussed their electric bus fleet adoption. The location of this one is Seneca, South Carolina, and the context is a small urban context. So, the promising practice here was the innovative use of a conversion, on site conversion of waste oil to fuel program that Tribe developed in partnership with a university. It's Humboldt State University. As you may have noticed by now, I'm not a native speaker, so I might pronounce some words very weirdly.

So, what California blue Lake Renteria transit system, they constructed this biodiesel conversion apparatus that takes the waste oil, cooking oil from their tribes, from their hotel and casino kitchens, and converts that into biodiesel that runs their transit system. So, the biodiesel is locally produced. And it has been in use since 2015.

They use a B20 biofuels bland, which means that 20% of their fuel is the oil, cooking oil. And 80% is still diesel. Like petrol diesel. I think that it’s worth noting that since the practice was adopted, the Blue Lake Rancheria has been able to reduce its annual fuel costs by approximately $5,000. And it's annually, right?

And it's greenhouses emissions by 20,000 pounds per year. The bio diesel adoption allows the tribe to decrease their operating costs. And further it is growth of being carbon neutral by 2030, which is likely to be achieved in the next, sorry, five years in advance of their schedule. So, in terms of key takeaways for this one, for this example, the external assistance was critical to development of this practice.

The concept began as a student, engineering student at the Humboldt University developed this project. And this project. So, the student university worked with a tribe, and they provided blue lake with the cost and benefits of switching to biofuel. Technical expertise from the university, from the shots Research Center and from the Office of Indian energy also added in the implementation of this practice.

While the primary motivation behind the Bio design program was implementation, the implementation of this program was the Tribe’s goal of reaching carbon net neutrality by 2030. The switch has also recruit reduced operating costs as I have previously mentioned. The second example we have is a clean some area of transit. It's about this transit and it's the adoption of electric bus fleet.

So, the fleet represents today half of the entire fleet, electric fleet represents today half of their entire fleet showing, also showing again substantial operating savings. Electric program was introduced in 2010 as part as a larger program and it would in reducing energy consumption and increase energy efficiency.

The buses were included in this program in response to the poor air for air quality, and the desire to cut operational costs for this system which is fair free. The program initiated by a partnership between the city of Seneca Cottbus, the Center for transportation environment, and the South Carolina Department of Transportation.

Cottbus plans from Area Transit they also formed a strong relationship with the South Carolina based Proterra. One of the large electric bus manufacturers in the US. Durational four buses were purchased in 2014. They used a tiger grant for this in addition to a bus love, I believe program grant. In addition to the bat versus to grant also purchased to fast charging stations.

And those are the ones where buses can park under a charger and then have fast charging. The regional bus electric program included electric buses, and those two-fast charging stations where drivers simply park underneath the charger. Sorry, I moved my slides. The buses have original expectations, and function, and efficiency.

The few costs were cut in half, and the maintenance costs was reduced by two thirds. These buses, they get 16.5 miles per gallon equivalent of point of 28 cents per mile to operate. The battery has also, they noticed the batteries have lasted longer than it is anticipated. So again in terms of key takeaways, and important reduction in operational costs important for a fair free system.

And the relationships that were created between dramatizations those partnerships and disclose this strong relationship between the transit agency and technology provider. Oops. The next one is the assessment asset management. So, Asset Management allow staff to record asset condition information and repair needs through a mobile application that allows agencies to prioritize and optimize repair and maintenance operations.

Emerging Internet of Things solution can also be incorporated. She's sensors and act predictively, having those predictively analysis to monitor your asset conditions. The case feature in our guidebook is the mountain lion asset mobility solution. The agency mountain line is in Flagstaff, Arizona. And a context here is a small urban context.

So, they shift their work orders from a paper-based format to a smartphone app, and a cloud-based system. Mountain Line serves Flagstaff, with fixed route bus services, paratransit, and seasonal services. And they coordinate a shuttle service with the Northern Arizona University. They move over 2.5 million riders a year in the year for 2019.

So, the system that they use for management includes 78. Their system sorry, the transit agency also has 78 bus shelters, 10 of which are shared with the university. And they have two connection centers and one big maintenance shop. Mountain line uses the transit asset management software, things of things to improve maintenance, work, maintenance, work orders, and process and reducing manual entry.

So, before the adoption of this practice, more work orders were entered manually, and then into a spreadsheet. So, the facilities division was interested in improving the solution and improvement, like just practice process, and eliminate the manual entry of those 10,000-word work orders that they that they process in a year.

So, when they developed, constructed a new storage facility, and that was another driver to get this app running because they use this capital grant to fund the initial three years of subscription of the app.

In terms of key takeaways for this practice, we can highlight the continuous stakeholder engagement, and support from senior leadership where that those were essential for the success of making a significant change like this. You can't just impose a change, a comprehensive change like this in taking manual work orders to an app without a very strong state engagement of the entire staff from everyone who is really dealing with the apps on a daily basis with management.

So, another takeaway the tracking or work orders has helped mountain line understand how staff spend their time and strategically allocate resources. This gave them the team more time to focus on other tasks, and how to understand when more staff may be required or not. Our next practice type is passenger information and GTFS feed.

Passenger information can be accessed by a number of devices, and agencies, and third-party applications. So, we use GTFS as a standard format for making trip planning accessible for public use, and use on interactive web, and mobile applications. We're featuring the case of state the state of Vermont, which is improving access to transit information to include demand response and volunteer run services.

So, they use the growing beyond the GTFS specification using GTFS flex. So, Vermont, we have a representative from the Vermont agency. But just briefly describing the go Vermont trip planner. So, in 2018, go Vermont launched trip planner that incorporated both GTFS and GTFS flex, allowing trip planners to provide more options than private sector counterparts.

The GTFS flex function is especially useful in the rural parts of the state where fixed route bus services are less common than demand response. I will, again, just highlight a couple of key takeaways. And we'll have, as Chris said, real people talking about this.

So, the state transportation officials and lawmakers supportive those for transportation demand management and transportation off options built over a decade of engagement was crucial to gathering necessary support and resources to implement this project. So, this is not something that you do overnight.

And another top point, another factor that was very important was that the organizations representing elderly and disabled for Vermonters, such as the Vermont association of the blind and visually impaired and the Vermont Center for Independent Living, were heavily involved in the process of developing the marketing of the application. Ensuring that we it could meet the needs of the populations. I think… Are we seeing these slides?

**Chris**: At the moment, we're not seeing the slides. But I'm sure they will come back. But this would be a great opportunity for Ross and Dan to tell us a little bit more about kind of the experience of making go Vermont live.

**Ross**: Sure, happy to. I think you're now though and Chris. Hello, everybody. Yeah, this whole thing stemmed from our desire to reveal more than one option for transportation around rural Vermont. We know that we don't have enough rural service to be a one click, one call resource for people to get to where they want to go.

So how do we add carpools and vanpools? How do we share open seats on our demand response services? That's really how this conversation started. And we went from there to whether we would go through an open source process, or work with a proprietary system and product. And we decided we would go forward with the GTFS program, build that foundation, and the open source space, and then allow the better mousetraps to come to us.

And we would choose our partners, as well as allowing for other folks to consume and reveal the data, let's say like a Google map, Google Maps, or trip planner. And so, we did go through the GTFS process and immediately realized that it was too limiting in terms of broadcasting and revealing our world transit services.

Quarter mile thresholds around bus stops, no flag stops, those types of things. And so through mobility on demand, we're able to embark and create the GTFS flex specifications. What that does is it does reveal those rural transit elements, it does show a wider range from bus stops. Knowing if you get five miles to a bus stop, you might be able to get your last 30 miles to where you need to go.

Demand Response areas and contact information to let folks understand their options for Medicaid or our elderly and disabled program. Flag stop areas, those types of things are doing a better job of revealing our services. It's also being used for our statewide ADL service, and Swiftly is building and distributing our data to the transit app.

And the transit app is now in use. And of course, one of the more appreciated elements of the ridership experience is understanding when the bus is going to get there, and when it's going to drop you off. So, that go Vermont trip planner, we developed a mobility on demand. That's been being used by our carpool and vanpool matching service. And they are now running that OTP through their own trip planner.

So, as we look at the go Vermont trip planner, it looks very similar, but it's now revealing carpools, vanpools, and transit and demand response areas. Next steps, we want to broadcast main response trips and seats, specifically matching to your ODs. We want to look at features. So, you can pay for any choice you choose.

We want to add the TNCs as well. And we'll be working with route match and uber to see how best to do that. And certainly we hope that Google who has provided our consultants with a beta adopts this program so that we're able to use really the most popular trip planner service out there. And that would allow us to have a scalable, universal, and affordable trip planner for all of us in in rural America.

**Chris**: And I've just got a quick question for you, Ross. Is thinking about a state like Vermont with a lot of your potential Go Vermont users being folks with their own connectivity challenges, and maybe even affordability of stuff as well as in Vermont, which is not called the Green Mountain State for no reason. There's a lot of hills valleys and opportunity for kind of missed signals and things like that. How have demographics and geography kind of influenced how you set up Go Vermont?

**Ross**: Sure. Well, we certainly have to have a call center. And so, we've had been contracting our call center, Go Vermont call center for eight or nine years. We certainly want to make sure that people can access on their phones, by their laptops, or have a phone option. We also have been working with the human service agencies, VOC rehab, our creative Workforce Solutions.

Those types of councils on aging. Those are the folks who can work with clients and access this tool as well on their behalf. So, those elements are certainly helping to distribute the information. But it is a challenge as we do have bus stops without cell reception. But fewer and fewer, every day as with COVID upon us, we’re doubling our efforts to improve broadband, and other internet services.

**Chris**: And another question I've got for you Ross is how much time and energy were spent trying to figure out how to make GTFS flex kind of work in that environment?

**Ross**: Sure. Mobility on demand project was a $600,000 project. Split between for my forming the updated specs, and then working with Cambridge systematics on their open trip planner, to, to work with them to help best reveal those trips. Since then, we're spending about $30,000 a year to maintain all of our GTFS flex data, and spending about $100,000 a year for that ETL system through our hundred and 35 routes plus. And so, overall, it has been an affordable endeavor for us.

**Chris**: Great, Okay, thanks. And then I'll just kind of put in the unpaid advertisement or reminder rather to our attendees, if to post Q's and A's in the box. And as you've seen here, if something comes up that seems appropriate to a particular presenter, I will chime in and ask questions. But I think we've now got our slide deck back on deck. And certainly Ross or Dan is your backstop. If you have anything else to say about Go Vermont. That's great. Otherwise, we'll have Reinaldo go on our next example. Your call.

**Ross**: Sure, please proceed. And then we'll be happy to answer any questions throughout the event.

**Reinaldo**: Thanks. So, I think I'll speed up a little bit more. What we're doing here with less of me talking to more of real-life people, real practitioners talking. So, the next practice type is the company CAD AVR and emerging CAD AVRinnovations. We've reduced capital investments are helping expand these capabilities, this type of capabilities for smaller agencies. So, vehicles now equipped with this off the shelf GPS hardware, such as a smartphone on a tablet, and software as a service.

So, business models where you pay for a service and you have all your background applications running on a browser or making those types of solutions more accessible for smaller transit agencies. Here we profile the case of Burton Earth, which is a miscibility. East of Quebec City, where they are using smartphone to geolocate their vehicles.

And they have a CAD AVR integrated with a fair system solution that allows the providers to see from a web page back in the office operational and ridership data in real life. So in the next slide, we have an image of all the equipment that goes into the vehicle. And that is just a smartphone, a little printer, and a smart card reader.

So, they have a for that specific case, having a smart card reader was very important. They really wanted to run away from the paper tickets that they had they have they sell monthly passes, and the distribution of those backs. These passes were very logistical II very burdensome for the agency.

So, having more people using smart cards was what they were looking for. And the solution that they found was this integrated fair mobility, and CAD AVR system that brought more operating benefits for their service, because they can now… They're very small staff agency, there are just three people back in the office.

And they can now easily see if vehicles are on time, or run reports, and export reports of ridership, and know things like which bus stops are more being underutilized or where the run is running behind. They also have on demand service so they can see where the vehicles are. And they have if this information that the smartphone sense of their location uploaded real time for our web field for the customer.

The next practice that we have is the one that we mentioned before was a composite one. So, this is not one specific case, it's a nationwide overview of fair payment technologies. Mainly mobile fair payment technologies that allow riders to pay transit fares with the use of their phones, or through mobile applications, obviously.

So, transit agencies can suit can choose from a wide variety of payment and validation methods, and business models and fare payment as a service this idea you have many companies doing this. So you have seen this grow.

We have seen this grow in the last several years. And I think that jumping ahead to main tech takeaways is while there are several business models and contract types for those mobile fair payment options, vendors tend to handle mobile app development, pay processing and the compliance of requirements and are paid based on a percentage of sales.

So it's more like a package or bundle service that they sell, and rise of those subscription base or pays as you go model provide agencies of all sizes the opportunity to use cloud based subscriptions services to manage their fair payment systems, and opposed to customizable systems for each one of the experiences that may be more expensive for the smaller agencies.

And our second to the last practice type is micro transit. And again, we have someone to talk about their experience. So but a very brief overview micro transit is a technology enabled demand response service that provides on demand access to transit via requests from mobile applications, as well as via phone or internet trip requests.

Like other types of demand response services, micro transits are typically operated with small, smaller vehicles. However, specialized micro transit software used to dynamically be used to dynamically generate routes that respond to riders’ requests in real time. So the goal is to have lower waiting times and a more efficient routing mechanism.

So the case we have here is Johnson County, they're using flexible service to make their first and last mile connection to fixed route transit. And I'll be very brief, just reading what we have about their service. And I'll lead leave open the floor to our residents to talk about this. So in 2019, Johnson County, Kansas located in Kansas City metropolitan area, they implemented their demand response service to connect residents to fixed route transit.

The service experienced a rapid growth followed by a need to rapidly modify operations in response to COVID-19 in 2020. So, as I've been doing to smallest key takeaways, while there are several types of business models and contract types for mobile fair payment. Oh, I'm sorry. I am reading the wrong key takeaways. I think I can open it for contribution.

**Josh**: Sure, thanks Reinaldo. My name is Josh Powers, I'm the business liaison for Johnson County. And you know, Reinaldo did a great job going over what we did here. I'm going to be pretty general until we get to questions if anybody has been for our service.

But I think the specificity of our region is what's important, because as you may imagine, if you're not familiar, Kansas is not a very dense state. Johnson County is the most populous and most dense county in the state where the economic engine for the state of Kansas, in the northeastern portion of the state.

But we've had fixed route transit for 40 some years that the county has provided. And due to the fact that we are very spread out we're about 500 square mile county with a population of just about 600,000. Fixed routes difficult to make work, especially in a very efficient way, especially as you get to the rural portions of the state.

So the thought here for micro transit was really to use on demand shared ride, micro mobility service that can connect people to our fixed route system and get them further than our micro transit service area. When you think of micro transit, I think most folks think of on demand service like Uber or Lyft in urban populations. For us, our micro transit service area is kind of the inverse of that. It's about 60 square miles. And so, our fleet is of seven vehicles there for transit connects, and we utilize TransLink as our software to have folks plan their trips, and see where they're going, and plan out their origins, and destinations, that kind of thing.

One of the key takeaways for us is that after about a year and a half of service which we are it is pilot we are not it's not a permanent fixture of our system yet although we do actually expected to be. We've done over 60,000 rides and our top three origin and destinations; our transit hubs are connections to fixed routes.

And so, we kind of bet on this proposition that people would utilize micro transit in this way. And it's played out in that manner. I would say that, you know, the pilot began in January of 2019. And so we had just over a full year's data when COVID hit, and obviously, that throws a large monkey wrench into all of our plans across the nation.

So you know, as we start to try to think about lessons learns and weigh two ways to apply what we've seen over the past year COVID puts a kink in that in that process. But I'll close briefly by saying that where our fixed route service, ridership is still down about 66% to our pre COVID numbers, our micro transit ridership has exceeded our highest ridership, pre COVID.

So this micro mobility, micro mobility service has bounced back much, much more quickly than the fixed route service has. So, I think it's an interesting, wrinkle and what we've seen, so I'll leave it at that unless there are specific questions in the chat. And thank you Reinaldo for that great overview.

**Reinaldo**: Thank you. Chris. I think I'll just, since we're almost there, the last one, we can continue and take questions in the end. So, our last practice, promising practice type are mobility hubs. They are… Sorry, yes. Can we move on one more? Yes.

So, there are centers where access to share mobility modes such as car sharing, bike sharing, ride sharing, and other shared mobility modes are located near transportation, public transit stops or centers of population and employment. The idea is to facilitate transfer between modes and access to services.

The case that we were talking about in the guidebook is the case of Indianapolis, where they are using, they're using the mobility hubs to strengthen community by building better connections between those modes. They are currently restructuring their server decks. So, their service is started in 2019. With a pilot covered initial 12 initial locations, they are marked by specially designed Wayfinding signs.

And I think we can move to the next slide where you can see some pictures of the urban furniture and the spots where you can park micro mobility devices, and those hubs. They include bike sitting Bike Share, bikes, your dog's transit, and of course, the transit component, which in this case is built along high frequency routes for high frequency bots. So, the thing here is, of course, this is a large, large urban scale.

But we believe that many root small and urban communities are also home to successful shared mobility programs such as bicycle libraries, public operated car sharing programs, or designated parking ride locations, that having you're having using a strategy such as such as mobility bills, mobility hubs, can facilitate carpooling, or vanpooling, or other sorts of public transit, the integration of public transit to other modes of transportation.

I will very briefly go now through what were some common themes that we identified across those practices that those 10 practices that we profiled, and they are partnerships, vendor research and engagement, stakeholder involvement and planning, those four things were highlighted as important to successful.

So, while those are practices, they varied in nature and types of benefits that they resulted for the transit agency. Those common tat themes they speak to the agency's resourceful agencies are resourceful in seeking out not only new practices, but in finding ways to fund an implement, implement new practice, there are cost effective and practical for smaller agencies.

So in terms of partnerships, we have a list of examples in the next slide. Where different practices have used this? Sorry, Andrew, can you go to the next one? Yes, so partnerships here. We have several depart the profile practices, they were made possible only because of partnerships and those contributed in terms of funding, staff hours, or technical expertise.

And one other thing not worthy is that the engagement was, and sometimes was with organizations outside of the transportation industry. And in addition to that, state governments also played in key roles and organization of some practices. Our next topic on our next common theme, was the vendor research and engagement.

This shows important stuff, for example, Cottbus here working closely with the parterre so their vendor technology, or is the case of the partner there, I talked briefly, that they went across the ocean to find a vendor because they couldn't find a solution in their context. So, being engaging and going beyond engaging with your vendor, your vendor, and going beyond with your research, above and beyond with research also proves to be to give good results in the end.

The third one, the third topic that we want to that we highlighted is the stakeholder involvement. And this is the involvement of external and internal stakeholders throughout the process of implementation does this is this means involving key organizations, key communities, organizations, their main strength, key stakeholders in the end, that they will help you shape your practice.

And also similarly engaging people inside your organization because that will create the landscape for the practice to thrive. And then you will understand whoever's developing this will understand better the needs and expectations, and we get everyone involved, the likelihood of this practice to succeed is even greater. And lastly, is planning. This one in the guidebook, we have each one of the processes organized in different in a series of topics, and one of them is lesson learned, lessons learned.

And planning kept coming back as an important lesson learned is dedicating time for implementation, dedicating time for adequate time for staff training, and planning for expansions, as we heard, just heard about Johnson, and Johnson County.

This unexpected thing about having this having your system being too successful, let's say, or being more successful than expected, sometimes. So this is, I think, what I had to contribute in terms of the common themes. And Chris can wrap up in terms of where you can find the guidebook that I believe is now available online already.

**Chris**: Okay, well, this is great. Thank you very much, Reinaldo. And as I said, if anyone has a quick question before we call it a day, throw them in the Q&A box. One question that I have, and this is kind of for everyone, but I'll toss it over to Alana. In all of this use of technology, especially consumer technology apps, smartphone-based things and so forth.

How did you go about making sure that things were appropriately accessible to your customers with disability? So, since what carta is doing or started to do before the pandemic was reaching out to users with intellectual disabilities? How is an app-based system…? How did that work out? Sounds like it'd be really cool.

**Alana**: So, this actually, this partnership started when Orange Grove, and DIDD actually contacted us. Able link had brought the technology to them. But in order for the technology to work, they needed someone with the public transportation system to kind of route it for them to see how it was going to all fit together.

And so that's how the partnership and everything kind of started. And with this technology, it's, it's based individually. So whenever we have a new participant, right now, I have four that I'm currently going to be working with whenever this pandemic goes away, but we base it to each individual. So each route I create is specific to that individual. I'm not sure if that answered your question.

**Chris**: Yeah, that was great. And I think one of the other things, and of course, now I'm thinking that transit technology in times of COVID, that should be our next NCAT webinar. But as things have been getting, again this is for you Alana, as things do kind of keep transitioning through the pandemic. What are your plans, future plans for kind of rolling out the stuff you've been doing in partnership with Orange Grove and Able?

**Alana**: I think, and of course, this is just a pilot program that we're doing with Orange Grove right now. I know that CARTA has said they are interested in purchasing the ad, so that we can use it with more clients than just what is at Orange Grove. We haven't quite worked out the details of exactly how that's going to work once we put that into play. And you know, even with a will link this technology could be used for someone who is visually impaired. It can even be used for someone with hearing impairment because you can personalize the pictures, you can personalize the voice, you know the instructions of what you're wanting them to do. And it's also used with GPS location as well.

**Chris**: That’s really cool. And as I recall, and in a guidebook, we have a link to this, you have a neat video showing how someone is actually learning to use the system and so forth. We can't play the video right now. But you want to kind of do a little pitch for what that video is like?

**Alana**: Yes, this video involves me and a young man named Kenny. And Kenny has an intellectual disability. And he is actually the very first participant that we have actually done. His route is completed, he was actually getting to ride the bus. And we got to ride the bus for almost a month and a half, almost two months before the pandemic hit. And he was doing very well with it.

We were almost to the point to where we were looking at maybe running the option of letting him try riding the bus by himself, just to see how he was going to do if he was going to hit his marks, if he was going to abide by the safety things that we had put in place. Kenny is very sweet. It was such a pleasure getting to work with him in Orange Grove, and just everyone involved. Able Link has been amazing. Orange Grove, the individuals there, the people that we've worked with just everybody.

**Chris**: And on another front, and this is for just in general. I'll point out and as we talked about fueling technologies. NCAT has put together and on the NCAT website, which you can see everyone can see on their screen in front of them. We've got some white papers, and we did a webinar on some other zero emission vehicles and so forth.

So, I commend folks to look at that. Question, and this is one probably for Josh, is was there any challenge in explaining what micro transit is either to customers of the system or to decision makers? Because actually, I find that sometimes working with local officials, they have a hard time figuring out what are you fixing to do in our county here? And I was just wondering, how did you go about it? Kind of explaining what the flex system was going to be.

**Josh**: Well, it's a great question. Thank you for it, Chris. We're lucky to have a really engaged Board of County Commissioners. And so, transit has been long a focus point for them. So, I would say that, honestly, we didn't have as much of a challenge explaining what we wanted to do.

I think our challenge was actually the opposite, that the utilization of micro transit in Johnson County was extremely high right off the bat. And so we thought we might have six months to ease into this practice. And we didn't have six weeks because we instantaneously needed to expand our fleet. And we did that. And it's kind of unique, certainly not to us. But in government, things can move somewhat slowly compared to the private side.

But because we were using local money, we could go right out and buy vehicles immediately right off the lot does not have to go through a procurement process. And one thing that I really mentioned that I think's important for folks who are interested, every locality is going to be different. And it's the specifics of your operation on the ground that are going to determine success or failure in my opinion. And one of the key secret ingredients to our success has been that we have a partnership with a taxi company in Kansas City, Missouri called WHC.

They operate the Z trip service, that's a national service people may be familiar with. But what that does for us is because we were so successful so quickly with this uptake by the riding public, we're able to flex those taxis into our service instantaneously through the transload platform. So that when our entire fleet is occupied, we don't run into higher wait times.

We can flex those vehicles in and get people picked up within our typical wait time, which is about 15 minutes, which again, in a dense urban place might sound like a long time to wait when you're in New York, or Chicago, or San Francisco and you dial up an Uber, you want it to be there in two minutes. But in the Midwest and place like Johnson County, 15 minutes is a very quick wait time for our ridership.

So, I think that again, on your question, we were fortunate to not have that problem. And maybe a little unfortunate to have the opposite effect, people just diving in with both feet and really utilizing rating wrapping their arms around the service. It's been a big benefit. And we think that because, again, of the specificity of being a largely rural, less dense place that micro transit really is in coordination with existing fish trout going to be the way of the future for us.

**Chris**: All right. Well, I think… Let's see here, I'm looking in the Q & A box. I guess we do have a question for you, Josh, which is how many vehicles are using the micro transit fleet? And remind us again, of the population numbers for Johnson County, I know it's big, but you just remind us of the number of people and the sizes that you're using?

**Josh**: Sure. So, we have about 600,000 people in Johnson County, and the county owns seven dedicated micro transit vehicles. So you can see that that's kind of a really small number. But a lot of those folks are obviously very spread out. So we have a number of four transit connects in different size configurations, 710 and 15. Passenger, ADA compliant. And again, when those seven are booked at any given time, we can with a flip of a switch basically, flex in as many as 300 taxis. And so, county owned seven total available 307.

**Chris**: Great. Let's see if we got any other questions. I think we're probably going to get ready to call this a day and call it a wrap on this presentation. But I do have one last question for Ross or Dan, which is what's going to happen next with Go Vermont?

**Ross**: Sure. We're doing a few things. One of micro transit pilot really interesting to hear Josh's presentation and the idea of being able to scale up to meet peak demand. We’ll capture that in the Go Vermont program or captured on the trip planner, as best we can.

We do want to get that bucket feature. And we do want to work with route match, or Uber, or whoever can do it to be able to interface those demand response trips. So that those would be revealed, broadcast, and offered through that trip planner, and are in our state 600,000 in the entire state of Vermont 620. We don't have transit, in every state in every town.

But we do have demand response services in every town, and how could we open up those seven to 12 seats on our cutaways that are doing demand response, Medicaid, or elderly disabled service? If we could open those seats up, we can really provide additional value for those who may not be eligible for one of our programs, but still want to save money time.

Agent plays these types of things, more trips. So that's something that we'll be working on, as well. And we'll continue to look for partners to grow out as many modes as possible. We want that Travelocity one click, one call bucket feature for all transportation options in Vermont.

**Chris**: Great, thank you very much. Well, I appreciate everyone being on today's webinar. I especially appreciate Ross, and Alana, and Josh for sharing their perspectives, and being able to feel the few in the weeds questions that that folks might have had for what you all are doing.

And a very hearty thanks to Reinaldo as the front person for the team at Foursquare that put this guide together and prepare this presentation. As you said earlier, this presentation is being recorded. We had a couple technical glitches at our behind the scenes in that.

There is a recording, we'll get that polished off and up on the website. And I encourage everyone who is attending this webinar or replaying it and later to look at the NCAT website for this guide, as well as other materials we have forthcoming. So, Reinaldo, any last words from your end.

**Reinaldo**: Just thank you. Thank you for everyone for listening to me. And if anyone has any questions, of course, we're all accessible.

**Chris**: Yes. So, thanks very much. And with no further ado, enjoy your afternoon, and everyone be safe out there.

**Reinaldo**: Thank you.

**Ross**: Thank you.

**Reinaldo**: Bye.