USDOT Integrated Corridor Management (ICM) Initiative

Transit Data Gaps for Rail Transit Systems

Initial Planning Workshop

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Overview:

During the Transit Data Gap for Rail Transit Workshop, participants worked to identify issues, specifically data gaps, which are affecting Rail Transit agencies and Integrated Corridor Management Systems. Conclusions that were gathered from this discussion are described below:

- To accommodate an increase in demand, it is often possible to add one or more train cars to a consist (train) that is currently in operation.
- Adding train cars to existing trains to accommodate additional demand may be constrained due to the length of station platforms (i.e., trains cannot be longer than station platforms).

- Depending on the headway, it may be possible to add a train to accommodate an increase in demand. There is a greater ability to do this for commuter rail operations, where headways are larger (e.g., 30 minutes) than for heavy rail operations, where headways are smaller (e.g., 5 minutes).
- It is possible for train operators to identify if additional capacity (i.e., additional train cars or trains) is needed to accommodate an increase in demand. Station managers may also be able to identify the need for additional train capacity, although not all stations are staffed 24/7. In other words, it may not be necessary to automate passenger counting, and to relay this information to the rail operations center in real time, in order to address increased demand (to identify when demand exceeds capacity).
- Transit data sharing may be an issue in cases where the data come from systems developed by vendors and where the data are proprietary.
- It is recommended that transportation agencies within a region "standardize" message sets or establish a common vernacular when agreeing to share data.

Workshop Transcript:

Steve Mortensen: Steve provided a welcome and overview.

Bill Anderson: Bill provided an explanation of how to use the various tools associated with the webinar and asked for participants to regard the meeting as less formal. He welcomed participants to speak up whenever. He also noted that participants will be able to download the contents of the web meeting and that the meeting will be recorded and notes will be submitted to USDOT (United States Department of Transportation).

Mortensen: After a presentation and explanation of Transit Data Gaps for Rail Transit Systems, Steve directed participants to the ICM (Integrated Corridor Management) website: www.ITS.dot.gov/ICMS/index.htm for more information and provided contact information. He then asked Gary Smith from Mixon Hill to continue with the presentation.

Gary Smith: Gary gave a presentation on ICM Surveillance and Detection and then asked for participants to introduce themselves and give short summaries of their experiences in relation to the issues discussed in the presentation.

Alan Gorman: You've touched on a lot of our gaps – getting the information to a central location, or working facility overload, or capacity remaining. Passenger loads in real-time – we don't have APCs (Automatic Passenger Counters) on every vehicle. Although we've got a little bit of a handle on arterials through our dispatch system – we can tell at least how fast our transit system is progressing parallel and crossing through the corridor – that doesn't really take into account any dwell time and stops so they reflect a little lower speed but you do see that they are progressing normally. One issue that we've run into recently – and I think it speaks to attracting more transit riders – we've developed real-time capability and as we started looking into making that information available to potential riders and riders with mobile and web-enabled devices, we have run into some issues that our Legal department is researching for us related to the release of the real time information. There are a lot of obstacles; there are also a lot of opportunities with technology. We're seeing the full gamut of what you've described today.

Smith: That's interesting. I wouldn't have expected that type of blockade.

Andrew Baker: Dealing with parking systems, our main focus is NTCIP (National Transportation Communications for ITS Protocol) integration. We don't have the entire system locked into a single vendor.

Dan Sise: I work for Laser Technologies, a company that is known for collecting speed with LIDAR. We also have a new sensor out that was just developed that collects data at a very fast rate – pulse rate, is what we call it. It can count things and sense things very accurately. I'm here just to learn about the market and/or find someone that wants to work with us in an OEM (Original Equipment Manufacturer) capacity

that could take this sensor, which provides information in real-time, and could incorporate it into a bigger system or leave it by itself to collect information and data.

Doug Jamison: I'm with the transit system in Orlando, Florida (Lynx). We're not actually a pioneer site but we've been following more in an advisory capacity. I can say with our site, even though we're not a pioneer site, we would have difficulty also with some of the real-time on-board bus information. We do have AVL (Automatic Vehicle Location) that we just put out, but we only have sampling data on APCs.

Smith: Are you collecting the APC data and downloading it at the end of the day?

Jamison: At this point, downloading at the end of the day when we come onto the property. And that would be approximately 10% of the fleet.

Vinh Dang: I'm just here trying to follow up and see what we have in terms of labor, or constraints, or issues with getting those data. One concern I have is trying to get either the ridership or schedule information from transit so we can use it during signal prioritization or to validate the signal prioritization and I don't know if we can also use that information for arterial operation.

Smith: That's a new item – the schedule and route information and how that coordinates with signal prioritization.

Mortensen: Vinh is with the Washington State DOT and that's one of the eight pioneer sites.

Tony Voigt: During our ConOps (Concept of Operations) and requirements development in Houston it became pretty evident that there were going to be difficulties and were gaps in the transit data that the Houston sites were going to have to work with, at least initially. Metro has been fairly aggressive in equipping their buses with APCs and AVL technology. The passenger counting does get dumped when they come back into the operations facilities in the evening so that real-time data capability for passenger counting is not there yet. Another gap that we found is parking data for park and ride information. It's not there but it's identified as a need. There's a key need to provide information to travelers that wanted to take a mode shift to transit in mid-trip. Another thing we found that may be problematic is communications. The AVL data is provided via a rather slow radio communications system, it's not necessarily a wireless Ethernet type. Transfer mode but over old radio waves, a county system, so that's one of the areas that we identified that would likely need upgrades to be a viable part of an ICM system. It's interesting hearing what's going on in other parts of the country and that's kind of what's happening with the Houston ICM and the transit data issues that we found during the process.

Roberto Macias: This is Roberto Macias and I am with the Texas Transportation Institute and with the Dallas pioneer site. Alan Gorman was already giving an overview of what was going on with the transit data gaps. What I could add is that about one month ago we had a meeting with all the key players and went over the data requirements, identifying gaps, and what we used was a table provided by Cambridge Systematics of input data for AMS. We identified where we were weak or we were strong. What I might add for the transit section, one of the things is schedule adherence. It is probably going to be complicated to get data for all the time, but maybe we could provide data for peak times. It's too time consuming for off-peak times.

Gerry Tumbali: This is Gerry with the Regional Transportation Authority in Chicago. We're not a pioneer site. The RTA is a funding and planning agency for the Northeastern Illinois region which comprises of three transit operating facilities – the CTA (Chicago Transit Authority), Metra Commuter Rail, and Pace Suburban Bus. We're pretty familiar with the data gaps because we're pretty far along with some of the systems that we have, but a lot of the enabling systems that would address these data gaps are in various stages of development or implementation within each of our service boards. That's sort of our challenge – we're fully aware of what data we want, we're consistent with what we want to achieve in the region as far as ITS is concerned, both within transit and with our highway partners, but sometimes it takes some time to get these enabling systems up and running.

Mortensen: The RTA has just finished a national evaluation with USDOT. There's two park and ride lots along their commuter rail service where they provide real-time parking space availability information.

Tumbali: I think that system was an effort within the ICM multi-modal effort. We have real-time parking availability at our train stations. We tested it so now we have a plan for expanding the system – obviously

that depends on our capital funding and the like. But the concept works, it's operating, but we just need to expand it. That's what I meant by saying some of these systems are in various stages of development.

Mortensen: And you provide that information via signs that actually provide the number of parking spaces available?

Tumbali: Correct. These are LED (light emitting diode) signs located at various decision points. Actionable information – we place them so people can decide whether to exit the highway and take transit beginning from that point on or when you are deciding whether to enter the park-and-ride lot. So these are location where, based on travel patterns around these particular corridors, we determine when people would have enough time to make the decision to take transit or drive all the way into Chicago.

Smith: Gary referred any interested participants to page 7 of Steve Mortensen's presentation (Transit Data Gaps & Rail Transit Systems) to a photograph of one of the LED signs. After confirming that there were no other participants that wanted to speak, Gary then suggested that the discussion of topic 1, capacity, begin. He asked if it was viable for the transit agencies to respond to some of these situations – do you have sufficient capacity and the ability to handle additional demand during peak time if, for example, we want to shift traffic off of the freeway or off of arterials on to your system?

Tumbali: It depends. Some rail lines will be packed during peak periods, themselves and may not have the extra capacity. Other lines are close to capacity but can still handle the additional capacity. It's almost, on the rail, on a case by case basis depending on the situation and where the incident happened and which rail needs to address that.

Smith: On the rail system you have an advantage that buses don't and that is that if you have extra cars you might be able to add a car.

Tumbali: Or we might send out additional trains if we have them. We have some capacity but some lines might not have it. If you have, for example, an incident response type of scenario and it happens during a peak period, we might not have that much.

Smith: How much warning would you need before you were able to do something useful, in your opinion?

Tumbali: I'm not sure. I don't know the numbers or particulars for that. The only thing that I can remember is the 9/11 incident, but that didn't happen during peak period, it happened after the morning rush. We had vehicles sent out away from downtown and back into the suburbs.

Voigt: Metro in Houston currently has very limited bus capacity. In addition they said they might have some issues with their bus driver unions. They didn't really elaborate, but that would be one consideration, as far as the existing union agreements with drivers, in order to provide additional capacity as far as drivers go.

Mortensen: Have you had a chance to talk to the Houston rail operators for the Metro line. Is that also the case for the light rail system there – they have a limited number of spare rolling stock?

Voigt: I think their rolling stock could accommodate. They've increased heavily. They have longer trains at this point in time. The red line is not within our ICM corridor so it has less of an emphasis, but I know they have extended ridership higher than they expected, but they do have the capacity for more cars and they can always decrease the headway.

Koorosh Olyai: DART has 30% free on their rail side. On the bus side, all transit agencies have limited to about a 10% spare ratio.

Gorman: That's a limitation imposed by FTA, I believe. That information may be dated – I know 8 years ago for every 650 buses on street, we were limited to 130 spares to continue to receive federal funding help with our fleet maintenance. There are, at the federal level, some limitations – or there were.

Mortensen: I wasn't aware of that because I'm more on the research side than on the deployment side. That's for providing federal funding. I realize that transit agencies usually don't have extra money, but they can buy extra buses on their own. The limitations are just if they wanted federal funding.

Gorman: I think one of the qualifications for some category in federal funding is 'what is your spare ratio?' You can't exceed 10% or you're rich, you don't need federal funding.

Mortensen: Recap of what we heard from the bus conference workshop: They basically all concluded that most of them do not have spare buses, they didn't think they needed to install Automatic Passenger Counters that would provide information in real-time. They thought the bus drivers could handle that by pressing a canned message on their mobile data terminals to dispatch for additional vehicles. They also said that they probably wouldn't be able to react to a situation quickly enough, but they did say they would be able to support mode shift for planned events. They also proposed that it would be a good idea to work with their highway partners in establishing a threshold that 'at this point of an increase in demand, we would deploy additional vehicles, and at this point of an increase in demand we would not be able to accommodate that demand'.

Doug Jamison: One of the other things when you're dealing with buses is the personnel, because unless I pull drivers off of another route, I don't have drivers sitting around that I can throw out there – they're already out driving buses.

Mortensen: You're correct. They also identified that they don't have extra drivers sitting around to drive the extra buses.

Jamison: Yes, otherwise we'd be pulling buses off of other routes and denying them service.

Mortensen: We thought it might be different on the rail side.

Jamison: Yes, rail would be different.

Dang: One time when we had a major incident in the area, there was some concern about the loading platforms for the commuter rail. Even if we had cars for it, the existing loading platform is not long enough. They would have to load people from the ground up or something. Instead of adding cars they added capacity by asking people to stand. Also, it's a good observation from other agencies that we find on a planned event it is much easier to exercise a mode shift, but for an unplanned event like an incident, we start wondering how much we can accommodate, especially when we have constraints with the bus schedule and the bus driver. How many people would drop their car off at a park and ride lot and take a bus or a train for an incident?

Mortensen: I guess we'll determine that as we move forward with this initiative.

Smith: What are the challenges for pulling this information together, particularly from the vehicles? Things like automatic passenger counting, parking space availability? Does anybody have any insights in those particular areas?

Gorman: The big limiter that has already been identified on the APC side is not only the APC hardware, but also the communication method. If you're going 800, 900 Megahertz data streams, you can be saturated or pushing your limits just with your peak volume of 500 or 600 buses out on the street, or however many you have. It's not a viable transfer mechanism for that type of data. With the parking capacity you can give qualitative information, like 'we do have spaces open' – the quantitative gets a little bit more difficult. Your facilities, as far flung as they may be, are much more likely to be connectable via ISDN or some other Internet-type technology; you're not dependent on radio transmissions and limited by bandwidth. Getting an exact count, ins and outs, almost implies you have sort of an APC on your entrances and exits that tracks in real-time the number of cars that are on the lot. We're certainly not going to have sensors out in the lot to make that determination so anything else you provide is kind of qualitative, subjective, observations by personnel can be reported in real-time. If you put up an LED on the highway that says we have 86 available parking spaces at the rail station, you're going to get 86 people to make that mode shift pretty quick and you're going to need to repost that the parking lot's full pretty quickly, I would imagine.

Smith: Did somebody in Chicago run into this? How are you getting the counts for those parking lots?

Tumbali: Loop detectors on the entrances and exits of these stations.

Smith: So you actually do count the vehicles in and count the vehicles out?

Tumbali: Correct.

Smith: Do any of the agencies online right now have a similar setup?

Samuel Johnson: San Diego is in the process of deploying some wireless detection devices at our cluster parking lots and we're going to do ins and outs as well as specific parking spots.

Andrew Baker: How accurate are you finding your loop detectors and such? We had a situation in South Africa where we were getting cars from a pay system and we ended up getting inaccurate data at the time and so what we ended up doing was individual day counts for the whole 5000 spaces of the parking lot.

Tumbali: We did comprehensive acceptance testing of the system and they're very accurate, as far as when a car comes in and a car goes out, how it's displayed on the signs. There are factors that influence it - for example, weather, or snow in the case of Chicago that might actually minimize the number of spaces we have available just because they're piled up with snow.

Smith: Or you might have somebody that's trying to park in two spots.

Tumbali: Yes. It's just entrances and exits, not individual spaces. But they're very accurate as far as the loop detectors are concerned.

Gorman: I'm wondering about the latency of it. If you say there are 20 spots available and there are 40 cars between the LED sign and the parking lot, 20 are not going to get a space.

Johnson: In San Diego we do plan to have a certain amount of cushion in there.

Mortensen: Gerry, have you had a situation where you've had a surge in demand in your parking availability because of major incident on say Interstate 80?

Tumbali: So far, no. We haven't had that situation. The lots have also been increased in capacity so it's enough to handle it. The size before had a utilization of 90%. With the additional spaces, it's probably around 80% utilization. We have room to handle any extra. We have to see if it's really full because of a surge or not.

Sise: Would you be interested in real-time data per spot - where a sensor could tell you if someone's in a particular spot and could direct them to say 'Level 3, Space 22'?

Tumbali: Our lots are surface lots, open spaces.

Johnson: That's part of a premium service concept we're looking at, to actually have people pay a reservation fee if they want a spot right up next to the platform. They could have surface parking as well.

_____: I saw your sign there that said how many open or full for your lots there. Are you integrated with any CMS or DMS signs on the interstate before that might say, "Traffic ahead, consider using park and ride lots" or is it just that one sign?

Tumbali: That is the plan – to incorporate the messages for the parking lot availability into signs that are operated either by the tollway or by IDOT (Illinois Department of Transportation) – but it hasn't happened yet.

Dang: When placing the signs for the availability of the parking lots, how far upstream, away from the park and ride lot would you broadcast your information – a few miles early?

Tumbali: We actually didn't consider that here in Chicago because we wanted to provide that information via the web so that in a case where you are doing trip planning, you can incorporate that as well. So actually we are thinking of getting away from the signage and just providing this information whether via interactive voice response or on a regular website.

Dang: You're heading down a path where you're wanting feedback from the user, such as 'here's the available spot, would you accept it?' and from there you have a more accurate count or immediate assessment of how available your spot is. Is that where you're heading?

Tumbali: Make it interactive you mean?

Dang: I kind of see that in the park and ride lots. Somebody mentioned something about reservation – it's a good solid way of having information about how many spaces are in the lot or if it's full without having to guess about how long to broadcast that information.

Smith: Actually in the VII program, where you've got communication from the vehicle to the roadside, there is a Society of Automotive Engineers protocol message set that includes the ability to make reservations for things like parking spaces. So in that respect, there's something 5 or 10 years down the road that might be possible, but right now, unless you have some mechanism in the vehicle for the person to make that reservation, you're back to can he do it by cell phone or is he doing it online before he leaves.

Tumbali: We happen to be working with Standard parking. I think they are one of the biggest parking operators and garage managers. We will be using their information for trip planning purposes, which include developing a multi-modal trip planner, driving versus transit, and drive to transit models also. Standard was going to provide us initially only the utilization, address, and location of the parking garages they manage, but they've approached us about maybe also including their "park to pay", which is their way of reserving the spot. So we're in consideration with them on doing something like that where we can have immediate feedback, as you mentioned, on what the availability would be at any given time. But these are not necessarily limited to only transit lots, but also private parking lots.

Johnson: I would like to have a conversation with you [Gerry] at a later time because we're looking at doing some of the same things in San Diego.

Tumbali: Standard parking is based in Chicago but they do operate nationwide

Mortensen: Advanced parking management systems for transit park-and-ride facilities are relatively new, of course, but I wanted to let you know that Montgomery County has implemented something similar for the Glenmont Metrorail Station here in the Washington D.C. area. The Washington Metropolitan Area Transit Authority is also planning on implementing a parking space availability information system at the Vienna Metrorail Station in Virginia.

Tumbali: To answer a question that was asked earlier, I might suggest one rule of thumb in that if you're going to post this information before the exit, it should be in the road segment right before the exit to the parking garage. If you go too many exits further away from that, you've got traffic coming onto the roadway that hasn't seen your sign yet. How frequently you put that information out on the roadway is a budgetary issue, not so much a technical one. But that last segment right before the exit to the parking garage is probably your best one, if it's long enough, for placing that sign.

Tumbali: We did a study here of travel patterns within our transit stations to determine where people might actually be at a decision point of whether to exit or not. But that's also the reason we wanted to make it more available to either the web or via calling, so it's available all the time.

Johnson?: think that's the same language we're using – at the "decision making point" is where we want the signage. That may be right before that exit or it may be further upstream.

Smith: Can you identify any information that you need in order to make decisions about your operation that you can't get now? We talked a little bit about parking space availability as one of those – are there others?

Tumbali: We're looking for real-time arterial performance.

Smith: When you say performance – what data do you need about the arterials?

Tumbali: Primarily travel time but also the incidents on arterials.

Smith: What do you want to know about the incidents – their location, how long it's going to take to clear them, how many lanes are blocked? What kind of information is useful to you?

Tumbali: All of the above.

Smith: Does freeway data affect you the same way?

Tumbali: We have freeway data.

Smith: So you have travel time and incident data coming off the freeways?

Tumbali: Yes.

Smith: And that's part of an Integrated Corridor Management of some sort at this point?

Tumbali: I wouldn't say management, but I believe the information is shared. There's no management like what ICM is envisioning.

Smith: Do you want the data handed to you or do you just want to be able to see it on a website – what form?

Tumbali: It's available on an agency to agency basis that's available to us on an XML (eXtensible markup language) feed from IDOT.

Smith: And that's the way you'd like to see it for the arterials – XML?

Tumbali: Yes. Similar to what we're doing, we've been discussing that here now, what we're calling a probe-based arterial monitoring system. Maybe a cell-phone-based technology – it's still not proven in arterials – or using transit buses as a probe if there's not enough coverage. So there's sort of a limitation in what's available for arterial monitoring. The highways have been covered, but the arterials may be lacking in information.

Mortensen: I would encourage you to participate in a parallel effort – they've already identified the data gaps for arterials – but the next step is to identify how to address those data gaps.

Smith: Has anybody else run into a data gap they need and haven't been able to find a way to get it?

Johnson: We have the same gaps here in San Diego. We actually just kicked off a pilot where we're going to be looking at some of the same wireless devices we're using in our parking applications to do mid-block arterial detection and travel time calculations. So, hopefully in about 6 months we'll have some feedback to share with you guys what our experiences were with using that technology.

Smith: Is anyone familiar with the work Purdue is doing on arterial travel times from signal system data? I believe they've added loops to the intersections in places where there aren't normally loops. But they're using the presence detection data available in the controllers in the intersection to count how many vehicles go through, how many vehicles go straight, how many turn, and approximately how fast they're going. They seem to be using that data to predict mid-block speed and travel time for the arterial segments around the intersection itself. This is part of one of the TRB studies.

Johnson: I think our consultant looked at that and felt it fell just a little bit short and that's why we were augmenting our signal system information with mid-block detection. We didn't feel it was really reliable enough to calculate that true travel time.

Mortensen: I have a comment from the audience that I would like to read. Someone said that they have a service they use called "gov delivery". "It's a service that we use here at DART to get information about service disruptions, especially advance notices, out to customers based upon their habits indicated by their interest in that particular route/mode category of information. Their website is www.govdelivery.com."

Tumbali: Yes, we're familiar with that. The gov docs. They scrape your website and email alerts to travelers.

Mortensen: Does anybody want to elaborate on that?

Gorman?: They actually don't scrape ours, we provide them with information. We subscribe to their service, pay a contract fee and we actually post free, consecutive broadcasts out to customers based on their having subscribed to that category of information, all the way down to the route level. If there's going to be a detour based on some city construction that's going to affect route 202, route 19, and route 52, we can target just that audience who signed up for information about that route and what to expect the duration is going to be. They've come a long way since the days when they just scraped your schedules. You get to provide the content.

Mortensen: I'd like to discuss if we need to know demand at rail stations in real-time, and if so, how we do that. Alan said that he didn't think so, that that could be accomplished via observation by a station manager.

Gorman: The real-time parking availability?

Mortensen: No, this is the number of people who say they have shifted off of the highway and now they want to take transit and they're waiting for a train at your rail station. Do we need to know how many

people are waiting or can the station manager just make that observation and relay that information to the rail operations center.

Tumbali: Some of these stations are not manned 24 hours.

Gorman: I didn't intend to speak to that question specifically – if there were standees on the platform – but I think if you have the capacity of the spare cars, certainly on the rail, you can hook up a three-car consist, barring any of the passenger unloading problems that we're discussed earlier based on the length of the platforms and the downstream destinations.

Mortensen: My question is: how do you know you need to add vehicles? You need to know there is an increase in demand to accommodate that.

Gorman: Our rail operators can absolutely tell – nothing but standees and standing room only on their trains. They have rear-view mirrors and they can see their first car at least. If the first car is packed with standees, all three of them are, if you've got a three-car-consist.

Mortensen: So the rail operator would be the individual that would notify the operations center if they need to send more rail cars or something like that.

Gorman: Typically, the only place you can pick up another rail car is at the end of a line or a yard junction. It takes a moment to accomplish it, but only a moment. Certainly if it's appropriate, it could be accomplished.

Smith: Are any of you putting information signs at the bus stop or rail stop that indicate, for example, when the next arrival time will be?

Johnson: Yes, San Diego is.

Smith: How are you communicating with those signs?

Johnson: We're going to be doing a combination of things. For our bus stops, we're doing it with general wireless. We're actually looking at using some of our radio data channel space in the 800/900 Megahertz spectrum for a few limited signs and we're also doing hardwire signs at our train stations.

Smith: The transit system I'm doing consulting work on myself, their automatic passenger counter data gets unloaded through a wireless Ethernet connection when the buses pull into the bus barn. But they're driving their signs at the bus stops through an Ethernet link that they've got to each bus stop. It occurred to me that once the bus doors close, you've got a little short window in there where you've got passenger counts and might have and Ethernet wireless node close by where you could burst that data without having to go over a wide area wireless connection. I didn't know if anybody had ever tried that or not.

Johnson: No

Mortensen: I have a question from the audience for Sam. Have you ever had any patent conflicts in providing information on the next transit vehicle?

Johnson: No we haven't. Has someone else had that experience?

Gorman: Yes, Tri-Met in Portland has had that experience and we're experiencing it in Dallas right now. It actually stopped us from real-time data provisioning.

Johnson: We've avoided little things like calling it "Next Bus." We've been calling it "Next Arrival."

Smith: I've actually run into a patent claim that has to do with counting vehicles in and out of parking lots. We have one project in Kansas City that we're working on with Mixon Hill that has been on hold for a year or so now, simply because there is a patent against using certain colors and notifying people of their traffic route information in real-time with messages – very broad patent claims that have made the customer nervous about doing anything. Patent issues are a problem in some instances.

Mortensen: Going back to counting the number of passengers standing at rail stops. I guess one way to automate it would be if you had a closed fare collection system for heavy rail systems. But for a lot of light rail systems you have the honor system. Do we really need to automate that and have that information or is everyone satisfied that the rail vehicle operator could provide that information to the operations center?

Johnson: We've talked about concepts like that in San Diego but our challenge has been, once we have that data, what true flexibility do we have in making operational decisions, even on the bus side, to put another bus, or another consist out there on the rail system. Its seems like those are the tough challenges, so we haven't been convinced that we can actually benefit from collecting that data about how many people are waiting at a station or bus stop. I'd love to hear if someone is actually doing this, if they take the data, do they take the extra bus out of service or not just an extra car, but do they actually put an extra train out there?

Mortensen: That's a good question. What we've talked about so far is just attaching a car to an existing train, but no one has actually talked about how difficult it would be to insert another train.

Gorman: It depends on the headways of the trains. If you've got a common corridor as we have in Dallas in downtown, where we have two lines that split to the north and the south, soon to be three, and you're already running a pretty tight headway, a 2½ minute headway, you're not going to be able to safely squeeze another car in there unless you've got one heck of a SCADA (Supervisory Control And Data Acquisition) system and some really great train dispatchers. Adding a car to a consist is a little easier to do.

Tumbali: On the commuter rail, if we could have the capacity, some commuter rail operators have done it, for example, if the express trains could stop at each stop now, considering the previous train for example, that was supposed to stop at these stops but is not working anymore. There's some flexibility, I think, within the commuter rail schedules to make some changes on the fly. But not necessarily for rapid transit where headways are more frequent. On a commuter rail you could have a 30 minute headway, so you do have some flexibility to adjust your schedule to maybe insert a train that is going to go to these stops, but those are very rare and those only happen when there's actually an incident within the commuter rail system itself.

Smith: When you have an incident within the commuter rail system itself, do you have any kind of automated system to help you figure out how to respond to it?

Tumbali: No.

Smith: You depend on the skill of your existing dispatchers, then?

Tumbali: Yes.

Johnson: I know we used our CAD/AVL (Computer Aided Dispatch/Automatic Vehicle Location) system to some extent, but I wouldn't say it's automated. I would say we rely on the skill of the dispatchers.

Gorman: I would echo that here in Dallas as well. We have high demand events at our convention center which lies adjacent to the light rail. We have added on consists. What normally runs as a 1 or 2 car consist, we've added a third car to accommodate increased demand. We've done similar things for planned events on the bus side. Those heat-of-the-moment decisions come down to the dispatch center and their ability to accurately gauge what you have in capacity and get it allocated. At some point you run out of extra board operators, because you don't have additional operators to man the buses.

Mortensen: If you needed to add a train, I'm assuming the same thing would be on the rail side – you wouldn't have rail operators sitting around.

Gorman: Every place is probably different, but a couple of extra board operators on the train could carry six cars, it takes one bus operator to drive one bus.

Smith: Are there any particular steps that seem evident that need to be taken to get information in and out of your systems to share with other corridor agencies?

Gorman: The standardization of message streams amongst the participating agencies in any locality. It's not a huge impediment, but that's kind of the whole concept of integrated management.

Smith: So, the message sets for the data themselves aren't all there.

Gorman: They weren't before agencies began to coordinate. In our example, we have the transit agency and the seven member cities that lie along the corridor. Getting us inter-connected through a single control center is pretty simple these days with Internet technology. But getting a common set of information in a common vernacular, for instance when you have an incident is important. Make sure you have duration,

the number of respondents, and standardization of the information content so that everybody understands and knows upfront what kinds of inputs are valuable to the other participants.

Smith: Does anybody have standard message sets for exchanging AVL data?

Johnson: I know we developed a message set for our CAD/AVL system that pipes the information from transit into our 511 system and I know we relied heavily on XML and the TCIP (Transit Communication Internet Protocol) standards.

_____: NMEA 0183 - you basically just need a longitude and a latitude and a vehicle ID and you can get a block number and a line number in there, then that's about all you need. This NMEA standard pretty well covers what AVL data should look like.

Smith: What about your Next Arrival data? Is there a standard message set appropriate for that yet?

_____: Again, what we were trying to utilize was the free Google maplets that simply display vehicle locations over a Google map. There again, latitude and longitude is all that you need, whether it be decimal, degrees, minutes, and seconds, it translates on their side. This prevents the need for any kind of translation of coordinate transformation.

Johnson: On our side, that calculation is actually done within the CAD/AVL system and then we export it with the XML feed. So on our 511 system, when you get that real-time bus information, it's just coming straight from the CAD/AVL.

Smith: Any other issues?

Tumbali: I think within transit itself, and I know at least from our experience here, we still don't really have a process for processing incident information so we get a lot of reports from our AVL/CAD regarding whether it's a broken system or a broken mirror, but there's really no assessment on how it impacts other agencies or other travel, unless it's something significant. That's really the only time that we may be sending out information to the public. But how it impacts the other services, there's no process yet, on our end, for processing and parsing incident information.

Mortensen: How about if there is an incident on one transit system operated by one agency. How well do other transit agencies come to their assistance?

Tumbali: Pretty good, honestly, but those are based on personal calls, faxes, etc. -- nothing system to system. It's pretty major for that to happen -- when a call comes in for assistance from other agencies. When that happens, it works pretty well; but as for day to day management, nothing really.

Smith: Is there any integration between different transit agencies for transfers, like bus to bus transfers or bus to train transfers.

Johnson?: I know we implemented that functionality but I can't remember how it works going across transit operators

Tumbali: As far as transfer connection protection? Within the agency, I think it works. They are offering products out there now for that. However, integration where it's a different service provider protecting a connection from another service provider, that's a whole new ball of wax.

Johnson?: I guess in our situation, we deployed a single regional system that our operators share. The data is somewhat separated and somewhat shared and I just can't remember how we do the transfer protection across operators. I think it just comes across as a data message from one bus to the other and then that driver acknowledges it, just like it would work within a single agency. I think for us, we did the same thing going across agencies.

Mortensen: [1:43:15]: The Utah Transit Authority developed connection protection system and there was a national evaluation done on it several years ago. They had connection protection between their light rail vehicle and certain bus routes where the frequencies were low. If there was a bus and it was, for example, a commuter route, and it was the last bus of the evening and the light rail train was behind schedule, it would send a message to the bus operator via their mobile data terminal to wait for the arrival of the train. I don't know the status of the system. It was having some problems. I don't know if they took care of the problems.

Johnson: The only thing we've talked about doing is piping the AVL data from our light rail system into our CAD/AVL system so the bus dispatchers can see the location of the train, but I heard that's a one way operation. The trains will never wait for the bus, but the bus will wait for the trains.

Mortensen: That's typically true.

Tumbali: The train never holds.

Smith: Is there any other discussion on solutions or approaches? I'll talk briefly about the next steps. We are in the process of developing a whitepaper on the transit data gaps, and the information from everyone here today is greatly appreciated. If you are interested in participating in reviewing the whitepaper, you can contact Steve. We are also developing a set of requirements and an action plan and that includes the possibility of other workshops or webinars in the future if we determine that they would be productive. We will also be exploring some options for the trials, of ways of closing theses gaps, which would include coordination with ICM demonstration sites. But I think there's also the possibility of non-ICM participants working in some of these areas with us as well. Is that correct Steve?

Mortensen: We haven't really defined that yet. It's my impression that it does not necessarily have to be a demonstration site to implement one of the limited field tests.

Mortensen: Steve thanked everyone for their participation. He reminded people to submit their names if they are interested in reviewing the ICM transit data gaps draft deliverables. He stated that the notes from the webinar would be sent out to everyone, and that the webinar recording would be posted on the ICM website if no one objected.