On Demand Transportation
Wishful Thinking Or Reality

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ABSTRACT

As the baby boomers hit the 60 year barrier (there will be one every 17 seconds starting 2006), the 80+ will be pushing higher, a number that is growing faster than ever. A majority of the 'new' seniors are moving into townhouses in the suburbs and not into the senior projects. According to Transit News [Mill 05], "if transit services were more readily available in their neighborhoods, three in five seniors would use them more often." This will have a major impact on the demand for trips on the transit agencies. It will mean more trips; more mileage packed in the same 8 hour day. This potential change in the demographic behavior will require the public transportation brains to re-evaluate senior transportation options. Will sending big buses on fixed routes to all these mushrooming communities make sense - as then fixed routes will not be fixed anymore. As we saw this past summer, rising gas prices have forced a much higher level of conscience among commuters to save money by taking public transportation. This can be ascertained from increasing ridership numbers this past summer across the nation (some places registered as high as 50% increase in demand). According to Transit News [Mill 06], "26 Transit Agencies recorded 25% or more increase in ridership." So a major question we will have to answer will be – will there be enough drivers, vehicles and support staff to cope up with this potential boom in demand. Over the past three decades this issue has been addressed in one form or the other, and we still don't have a clear cut picture on what works and what doesn't. A big factor in lack of appreciable success for these efforts was lack of adequate technology. However in the last few years, technology in the form of Internet, Wireless technology, Kiosks, Voice Technology, and Smart Cards etc. has created the potential of transforming the transportation systems for the better. The United We Ride initiative if fully implemented shall address these concerns. We intend to share in this paper our efforts under the UWR philosophy in different parts of the country using different technologies to solve different aspects of the entire problem under the banner of a related concept – On Demand Transportation. In this concept a rider can reserve seats on any and all forms of transportation he needs to take, pre-pay for it and become a subscriber to a 'community' of users. Similarly on the supply side, vendors can create their own communities to provide seamless transportation, sharing fare codes, using same technologies etc. We use the internet to create and manage these communities. In Massachusetts we enable 200 private vendors to bid, via a Vendor Portal for rides in an open and fair manner to compete for 70% of MassHealth rides (DMA, DMR, DPH). In California we bring clients, Transit agencies - public, private and subsidized transit providers, and clearing houses together in a virtual community called Calnections.com via the web (a Rural Trip Planning Project), so they can share clients, and vehicles across geographical boundaries. Later they can add AVLs and SmartCards to streamline interaction across regions and streamline fare management. We are striving towards creating stream-lined views of the transportation universe where a client can seamless go from one location to another, hassle-free. This capability shall encourage advanced planning, and hence better utilization of resources. It will also create more judicious use of technology dollars, and hopefully migrate some excess dollars for the drivers and dispatchers.

INTRODUCTION

The concept of On Demand Transportation is not new (it has been attempted multiple times, and its most recent incarnation is the Flexible/Deviated Fixed Route), however it has really never taken center stage. It is common knowledge that the rider-ship on Fixed Route vehicles has been declining

steadily, the ridership in Paratransit services keeps rising. The main reason appears to be the convenience of calling and booking a ride, and then being picked up from curb-side – as opposed to walking to the nearest bus-stop. Even though the Government is pushing hard to migrate travelers from Paratransit type services to fixed route services, the success has been very spotty.

CURRENT STATE

Fixed Route vs. Paratransit Service

Fixed route service runs large buses across cities on routes that don't change from day to day and where travelers can either wait and board a bus at a stop or flag the bus. The service is not dynamically altered if the demand goes down or up intermittently. Paratransit services are demand-response in nature and hence are purely driven by demand. However due to the unpredictability of the demand, the throughput of this service is restricted. The services typically have been set apart operationally too, where usually two separate companies run the service for the same transportation agency. The drivers also do not cross over from one service to the other (in several instances due to union policies). The 'fixed' nature of the Fixed route services also puts less pressure on the dispatchers, while the demand-response nature puts an inordinate amount of pressure on the Paratransit dispatchers

Different Technologies for the Two Systems

Different scope of services has resulted in evolution of largely different technologies to manage the two systems. While inherently they are two forms of essentially the same service, but different operational environments have bred two separate tracks for technologies. They have grown to be so different that it is almost inconceivable to imagine that the two systems could be driven by the same 'software'. The unification of the two systems can begin with unification of computer systems that are used to run the two operations

Demographic Changes

The baby boomers are moving into the 'senior' category at the rate of one every 17 seconds. Though most are savvy and shall drive for a long time to come, some of them will start migrating towards public transportation, especially if they have retired and do not travel on a regular basis. US public transportation and elderly care providers are all bracing for the baby boomers to demand better access to public transportation. Their needs on the other hand will be different because of their relative affluence and suburban settlement trends. The demand response will be more suitable for their needs. However demand response vehicles do not have enough capacity to absorb this surge in demand. Unlike their predecessors who happily moved to projects, this generation appears highly unlikely to move out of their suburban town houses. Clearly sending big buses to those townhouses is going to be less likely.

Super Seniors

The 85+ age group is continuing to swell. Several of them are still fairly active and will continue to drive better level of service. Helping them out by better planning their trips – in advance – and then negotiating their plans with the transit providers and agencies would be a good service. The senior centers can act as travel planning centers, and this will allow greater leverage in getting the super seniors to take more pre-planned trips, increasing the predictability in the public transit systems.

AMALGAMATED TRANSPORTATION

Now for a moment lets assume the two services merged into one. There are big buses and vans, there are trains, the ferries and the metros. If we see it from the Amalgamated service prism, the issue can be reduced to that of offering n number of seats going from A to B, at a certain rate. The seats can be bought ahead of time for a period of time or on the spot. The occupancy can then be broken into predictive (fixed route) and un-predictive (demand-response). Now if the drivers are trained across board to take on special requirements passengers, and there is a single computer system to manage them all, then one can visualize a seamless transportation system. Easier said than done. One will need multiple miracles for this to happen

Miracle #1: To Get the Unions to Agree

Although the Fixed route and Paratransit workers might belong to the same union, getting them to allow members of one form of service to operate another form is a big challenge. The hourly wages are different, the training required is different and even the working hours might be different. But technically they are both doing the same thing driving the buses and ferrying people. If for a moment, we imagine that all fixed route are not the big buses, but can also be on the El Dorados, then these buses can be marked for bringing people that have booked rides in

advance. Then we can visualize how Paratransit drivers could be driving 'fixed route'.

Miracle #2: To Get The Clients to Agree to Call in Advance

This is harder than talking with the unions. Since the clients want the flexibility of making their decisions on a day to day basis, rather than discuss personal travel plans with someone at a senior center. However the clients getting better seats, more advance notice for changes in schedules, and having a bus pick up from the curb might be huge upside that the clients might want to trade in their plans with. Also, getting into habit of calling in advance is a difficult one, especially if they see the bus pull up every day at 9 AM. But offering them a subscription capability where they periodic updates and even frequent traveler benefits might be big attractors.

Miracle #3: To Get the Technologies to be Synchronized

Major technology vendors have developed different expensive programs for different services. So a vendor has a Run Cutting program for Fixed Route and A real time dispatch program for Paratransit. So the transit agencies have to setup different facilities to monitor the two services. If the software vendors were to offer the same program that could handle both fixed route and Paratransit from the same computer terminals, the need for having two different center will diminish, and the staff better utilized. Clearly today, the Paratransit dispatcher operates under very different stress levels than the dispatcher of a fixed route system. Having a single system to monitor both the operations, but one that also ties in garage and fleet maintenance shall be one that will clearly offset any perceived complexities of merging the two operations.

Miracle #4: To Get One Operating Company to run Both types of Services

This is perhaps the easiest of all. Most of the operating companies do run both types of services in different places. Getting them to run both services will not be a big challenge. The main argument against this approach shall be their reluctance to lose 'admin' money – that will be a potential fall out. One will need only one General Manager, and not two. The dispatchers can handle both fixed and Paratransit. The call takers for Paratransit can also handle the subscribers. The avl system can call out the subscribers, and inform them of the impending arrival of the bus. However, most of the operating companies will find this approach palatable as then they don't have to worry about competition from another in-house company.

Miracle #5: To Market the Value of the Amalgamated Services

Since the transit agencies are not geared towards to marketing like corporations, it is a hard problem to get past. There are no marketing budgets, selling advertising on their buses is what most of the agencies relate to when the word 'marketing' comes up. But weaning travelers to your services requires a lot of marketing effort, and creative marketing strategies will have to be created to address the lack of budget issue. Marketing barter could be a way. RTAs could market for Starbucks coffee if they will in turn market the RTA services. This might be a primitive idea and a lot of work still needs to be done.

Miracle #6: To Get This Approach Blessed at the State and Federal Level

This is probably the hardest of all challenges. Even though there is so much of emphasis on coordination of rides and even if we factor the backing that the president is providing to the United We Ride program, influencing such changes at the state or the national level is going to be non-trivial. First it will imply different thinking about the 'modes' of transportation. We will have to move away from thinking in terms of Fixed Route or Paratransit or even Metro and trains, to thinking in line with how many seats are available between an origin and a destination and how best to fill them up. In addition, to think about public transport travelers as a community that can be brought together electronically and reap the benefits of a collective. Much like the NRA or AARP, the benefits of creating a large group of consumers can bring in other benefits like group health insurance for self-employed, collective purchasing power, and even political strength.

ON DEMAND TRANSPORTATION

If these miracles do happen, we can envisage several scenarios of a future where one could avail of the public transportation in a more predictable and more comfortable way. Potentially with a pick up and drop, off the curb [Bhat 05].

Scenario #1: Planning Travel

In this scenario folks can go over the internet and evaluate their travel options – public, private or

public-private – and then proceed to book rides for 3 months. That information will then get posted over a portal that the providers will access, and respond to the requirement. In this scenario a collaboration of public and private providers will post 'seats' and fares that a computer algorithm will consider when suggesting itineraries for individuals. Once the itinerary is selected and accepted by the consumer, he can either pay for it online or enter a pass number (in case he is a subscriber or owns a transit pass). All the seats taken will then not be available to other travelers. On their side the transit providers (whether public or private) shall then have to confirm the rides with the consumer after they have scheduled them. In case there is a conflict the provider can call the client. On the other hand if the seats are purely on routes that are already confirmed, then the seat allocation may not be reversed. This scenario is currently being implemented in 5 counties of Frontier rural California, under the aegis of Modoc County Transportation Commission.

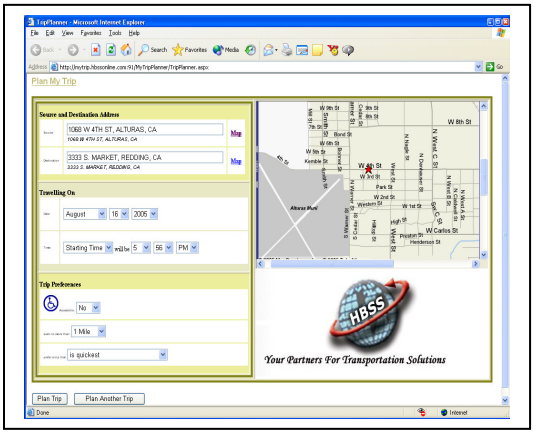

Figure: Systems like TRIMS/Planner from HBSS, A Web Based TRIP Planning Tool, can be used for helping Seniors plan their rides in advance.

Scenario #2: Senior Call Center

In this case, the same tool is now available to volunteers that form a call center at a local senior center. The consumers can call the senior centers and can explain their travel requirements. The call center can then use the same tool to book rides on itineraries preferred by the consumer, get the id number and confirm rides. In this case all the communication with the provider shall be done by the call center. This is an experimental project that is being planned for a Council on Aging run senior center in Massachusetts

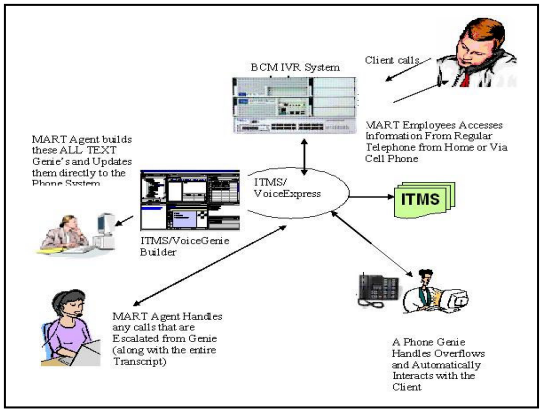

Figure: Systems like ITMS/VoiceExpress from HBSS, a VOIP based IVR system can help Senior Centers be converted to Call Centers and help travelers to plan their rides.

Scenario #3: Kiosks at Public Places

This scenario involves self service kiosks at public places – college campus, transit centers, hospitals, senior centers - that allow seniors to book and plan their trips in a self service mode using their fingers. The added benefit here is that the kiosk can be multi-purpose and can provide more information besides transit. This is an experimental project that is being planned for an Inter-modal Center in Massachusetts.

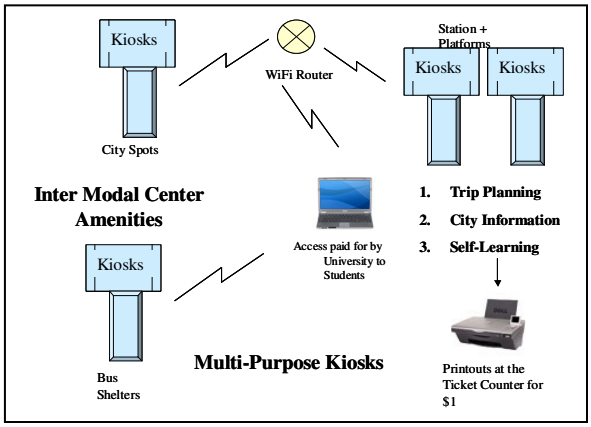

Figure: Systems like ITMS/SelfServe from HBSS. A Kiosk based TRIP Planning Tool can be used by users themselves to plan their rides in advance at public places.

Scenario #4: Integrated Dispatch Operation to Offer Rides on Fixed Route Buses

A scenario where the Paratransit dispatch and fixed route dispatch is all blended into one operation. This scenario allows Transit agencies to offer fixed route, Paratransit, flex route, as well deviated fixed route services. Some agencies currently offer some form of flex and fixed route services, however the spread is few and far in between. With an integrated dispatch software system, this capability can become main stream. This is currently being tested at Cape Ann Transportation Authority. Currently we are also evaluating this option at a facility in Maryland.

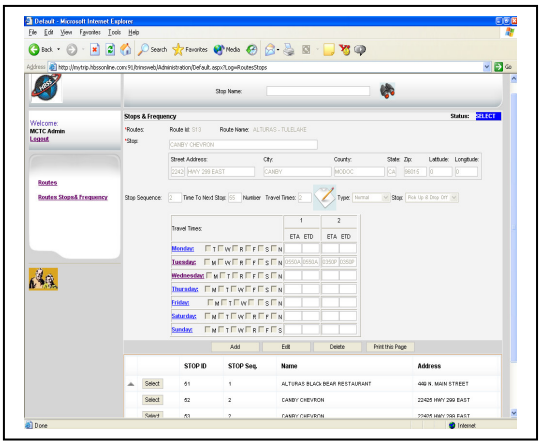

Figure: Systems like ITMS/BFRS from HBSS, a Web Based Integrated Fixed Route and Paratransit Dispatch System for Regional and Rural Transit agencies can allow the agencies to view Fixed Route and Paratransit routes on a single screen.

Scenario #5: Private Vendors Use a Web Based Vendor Portal for Ride Sharing

A scenario where the small transportation providers can use a web based transportation software system to manage their operations. In addition they can post their routes for use by other transportation providers who can then do cost sharing similar to the airline industry. This system is currently in use at a brokerage in Massachusetts.

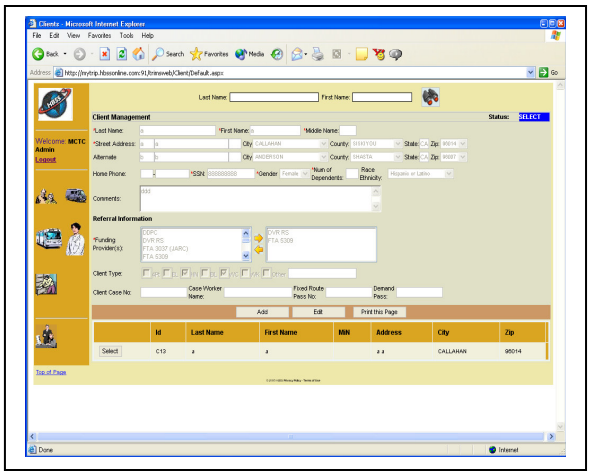

Figure: Systems like TRIMS/Web from HBSS, a Web Based Transit Management System for Private and Small Transportation Providers can allow them to post and share rides

CONCLUSION

Clearly the efforts in the transit industry are in the direction of better coordination through technology and a very large number of efforts are underway. The pertinent question is can we bring all the disparate efforts in a convergent fashion to morph the operations to demands of the next generation of seniors who are hitting the 60 year barrier at the rate of one every 17 seconds (the baby boomers), and the demands for seniors who are now heading in the 80+ spectrum but still very active. And demands for regular folks who will need to depend more on public transportation given increasing cost of fuel. Technology has evolved to the extent that all possible forms of point solutions are now available in the market place. However, the lack of industry strength integrated technology systems continue to create fissures so apparent in our transit topology. The integration firms tend to resolve some of these issues by integrating different point solutions, but time has come where vendors should provide plug and play components that allow transit agencies to buy what they want, and simply plug it into their system and keep growing. HBSS has the vision that there will be potentially 2 or 4 major players that may provide complete transportation solutions that operate in a plug and play format. The net result will be a seamless transportation system both at the front end (demand side) and the back end (supply side).

REFERENCES

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