# PARATRANSIT FOR MOBILITY-IMPAIRED PERSONS IN DEVELOPING REGIONS: STARTING UP AND SCALING UP

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Front cover: The title of the publication, "Paratransit for mobility-impaired persons in developing regions: Starting up and scaling up," is superimposed on the image of a green traffic light with the icon of a person moving forward in a wheelchair. Across the bottom of the page a stripe contains text stating "Prepared by Access Exchange International, San Francisco," followed by photos of a paratransit van in the fleet of Persatuan Mobiliti, in Kuala Lumpur, Malaysia; and of a test session to improve accessibility to motorized auto-rickshaws in New Delhi, India, coordinated by Svayam in New Delhi.

# Paratransit for mobility impaired persons in developing regions: Starting up and scaling up

## Introduction

**This guide is practical. It is results-oriented. It is not an academic study.**

It is about addressing the need of persons with disabilities and others for paratransit service when accessible "fixed-route" bus or rail service is not available or, if available, cannot be used by persons who need more specialized transportation.

This guide is written for city officials, transit operators, entrepreneurs, non-governmental organizations (NGOs), social service agencies, and others who may wish to start up or expand door-to-door paratransit services to help mobility-impaired persons to get to where they need to go. It is not aimed at countries which already have such services and have the resources and money to support and pay for them, although many of our findings will be relevant to them. Rather, this guide provides information and guidance for cities and towns and villages in less-wealthy regions faced with many barriers to such transportation. These barriers are so great that many cities, to say nothing of the countryside beyond these cities, have not begun to address the task of providing paratransit for those who most need it.

The financial, infrastructure, and operational issues are daunting. In many rural areas, nearly *everyone* is mobility-impaired because there is very little public transportation. The situation can be equally bad in cities for persons with disabilities who are unable to use bus and rail lines. They remain trapped where they live, unable to get to work, to school, or to medical help and other activities due to the prohibitive cost of hiring a taxi or finding an accessible vehicle.

> To provide guidance in these situations, we will be helped by the example of practitioners in cities which have begun to address some of the needs of mobility-impaired citizens. We will look at case studies of paratransit systems in São Paulo, Cape Town, Moscow, New Delhi, Istanbul, and Kuala Lumpur. We will also bring in the hard-won knowledge of paratransit systems in countries with longer histories of paratransit provision, such as the USA and France, or wealthier cities such as Hong Kong or San Francisco.

If the problems are large, so are the opportunities! This guide is about leveraging opportunities to overcome problems.

### Key definitions

Accessible transportation refers to public transit systems and services designed *and* operated so that they are usable by some or all persons with mobility impairments. For example, when

such vehicles are used to serve persons who must remain in wheelchairs during travel, they would be equipped with lifts or ramps and with safety features to accommodate wheelchairs.

Paratransit means different things in different countries. In this guide, "paratransit" refers to the use of small vehicles, such as vans, mini-buses, taxis, motorized auto-rickshaws, cycle-rickshaws, and similar vehicles operated to exclusively *or* partly serve mobility-impaired persons. Such services are generally "door to door" or on special routes, and are sometimes called "demand-responsive" services or "dial-a-ride" services. See page 5 for more details.

Mobility-impaired persons include

(1) *Those with mobility, sensory, or cognitive impairments that make it difficult to overcome barriers to travel.* Persons with *mobility* impairments include those with visible disabilities (such as people who use crutches or a wheelchair or a cane to enhance their mobility) and invisible disabilities, such as persons with a heart condition or arthritis. Persons with *sensory* impairments include those who are blind or have reduced vision, or are deaf or deafened or hard of hearing. Persons with *cognitive* impairments include those who cannot easily figure out their environment to use public transportation due to intellectual disability (e.g., Downs syndrome or dementia) or due to the sheer complexity of travel (such as we all feel as tourists, visitors, or newcomers to a transit system in a big city).

(2) *Seniors, women, children and others* are also frequently mobility-impaired when they find themselves in situations where they cannot overcome barriers to travel, perhaps due to inability to reach transit stops or fear of crime or violence or other obstacles.

**How to use this guide**

Readers are reminded that no two paratransit systems are the same. This guide introduces an array of topics. Within each topic, we *describe* solutions that have worked for many agencies without trying to *prescribe* solutions if they are not relevant to your situation. Small agencies may find some of this information less relevant than larger agencies. All agencies are urged to go beyond the introductory material in this guide by consulting further resources on each of the topics.

If you are in the public sector, such as an official with a government or municipal agency, you might find Sections 1 through 4 of the guide a good starting point.

If you are in the private sector, such as a manager of a transport or other business, or an entrepreneur thinking of starting up or expanding a transport service to include persons with disabilities, you may wish to first look at Section 1 as well as Sections 4 through 9 before proceeding to other parts of the guide.

If you are in the non-profit sector, such as a social service agency or non-governmental organization (NGO), you may wish to first look at Sections 10 and 11 for especially helpful material, then go on to the many other topics of the guide which will be of interest.

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**Go to www.globalride-sf.org/paratransit/supplement for more detailed sections that augment the content of this guide.**

# Key findings

(1) Around the world, demand-response paratransit services are needed to supplement accessible "fixed-route" bus and rail services. Paratransit services will always be required for those seniors and disabled passengers who are unable to take other public transport to their destinations, or are unable to reach transit stops and stations due to inadequate sidewalks and road crossings. *Both* accessible "fixed-route" *and* more specialized paratransit services are needed.

(2) When *available* and *accessible*, transport modes open to the general public tend to be more inclusive, less expensive, and more cost-effective than more specialized paratransit services. Bus, rail, taxi, auto-rickshaw, and cycle-rickshaw services should be encouraged for seniors and persons with disabilities who *are* able to use them.

(3) Public, private, and non-profit sectors should work together to promote paratransit services. This is demonstrated in our case studies of cities contracting with private providers. Cities can also promote paratransit services by subsidizing the purchase of vehicles or providing lower-cost fuel and maintenance for NGOs and other agencies.

(4) New technologies have opened up new possibilities to expand paratransit service, such as the use of smartphones, tablets, and GPS devices.

(5) Smaller vehicles can be used to scale up lower-cost paratransit service. The use of central call centers, along with minor design changes, can assist auto- and cycle-rickshaw agencies, as well as taxi companies, to provide lower-cost paratransit with less dependence on public subsidies.

(6) Paratransit service within each of several zones may provide more trips for more people in large cities, especially when accessible bus and rail services can assist by providing citywide connections.

(7) NGOs can work together to save money on fuel, maintenance, and training, and in some cases may save money on vehicle procurement as well.

(8) Smart scheduling will better serve passengers at a lower cost per trip.

(9) Look before you leap! Paratransit providers may benefit by phasing in their services without locking themselves into too many commitments. This will provide more flexibility to reconfigure services based on actual experience.

(10) Stable funding sources must be identified in order to sustain large paratransit operations. This is a lesson we learn from Moscow, São Paulo, Istanbul, and other large cities.

(11) Demand management may help expand paratransit to rural areas where services do not currently exist. Consideration should be given to scheduling services at periodic intervals along with other approaches to providing transport at a sustainable cost.

(12) Cities should consider mobility management or paratransit brokerages among the many alternatives for promoting paratransit services. City staff should prepare detailed action plans to prioritize alternatives and select ways to start up and scale up paratransit services.

# Section 1: SERVICE MODELS & NEW TECHNOLOGIES

***Purpose of this section:*** *To introduce different business and service models for practitioners who may wish to start up or scale up paratransit services for persons with disabilities. New technologies may create new service models, especially when used with taxis or with auto-rickshaws and other lower-cost vehicles.*

### Introduction

In every country there are different types of transportation for different purposes, ranging from walking or animal conveyances to the private car to many different types of public transportation including buses, trains, taxis, and auto-rickshaws. “Public transportation” is often defined as transit service open to the public that charges fares. "Paratransit" is a sub-set of public transportation that uses mini-buses, taxis, or smaller vehicles that usually do not follow fixed routes or schedules.

Paratransit services may consist of a taxi or small bus that will run along a more or less defined route and then stop to pick up or discharge passengers on request. More often, paratransit systems offer call-up door-to-door service from any origin to any destination in a service area. Paratransit services may be operated by (1) public transit agencies, (2) for-profit private companies or operators, and (3) NGOs and other not-for-profit organizations. This guide is written for these three categories of agencies and the people they serve.

The definition of “paratransit” that we use on page 2 further limits our discussion to transportation that “exclusively or partly serves mobility-impaired persons.” These passengers often represent those who most need the transportation, are least able to pay for it, and, accordingly, often receive the least service. Historically, these services, when provided at all, have been provided by the third category – by voluntary, NGO, or social service agencies around the world, that is, by the non-profit sector. In less-wealthy regions of the world, paratransit for mobility-impaired users is offered mainly by these agencies, usually for their own clients so that they can get to health centers or schools or other social service facilities.

> Fortunately, there are hopeful signs that paratransit services may be increasingly operated by the first two categories – by public transit agencies and by for-profit companies and operators, that is, by the public and private sectors. This trend may result in expanding paratransit services in many locales – a “scaling up” of current services – to the benefit of riders with disabilities. For this reason, this guide includes case studies looking at paratransit for mobility-impaired persons offered by the public and private sectors.

A major goal of this guide is to promote coordination between the public, private, and non-profit sectors to join forces to start up and scale up paratransit services.

### 1.1 Public sector ownership and operation of paratransit services

Public sector agencies, such as city governments and transport ministries, have many advantages. They are stable and often powerful, and they may have the ability to adopt and enforce plans for a range of social goals. For example, city governments have a unique ability to create a sustainable funding base for paratransit services because they have taxing powers and may have access to funding for purchases of vehicles or operation of services. But these public entities may also have disadvantages, including bureaucratic inefficiencies,

poor management ability, difficulty in controlling the cost of service provision, or political agendas.

Public sector paratransit entities could take many forms, operating at national, state or local levels. They could be created under a variety of legislative models, granting them power under national or state or local legislation, or formed by joint agreements between two or more local governments using their existing legal powers.

### 1.2 Private ownership and operation of paratransit services

The private sector has a different set of advantages and disadvantages. On the one hand, for-profit taxi and other transport companies may be more innovative, flexible, and efficient, while keeping their costs under control. They may provide better and more professional management with more technical expertise. On the other hand, their need for profits may result in less safe operations (disregarding traffic laws), poorer maintenance of vehicles, and disregard for regulations – resulting in “la guerra del peso” or “the battle for the dollar” in some operations in Latin America, Africa, and Asia. These disadvantages are of special concern when it comes to paratransit services for persons with disabilities – some transit companies may not wish to pick up disabled persons if they take longer to board, or they may ignore lower-income neighborhoods.

Private sector paratransit entities can take many forms, ranging from a single driver who owns his own vehicle to family businesses, partnerships with several owners, joint stock associations, various types of cooperatives or associations of owners, and large companies with both owner-operated vehicles as well as vehicles that are rented on a daily basis by other drivers. In the USA, for example, taxi companies often "lease" their vehicles to drivers who are "independent contractors" who then keep all fares, making whatever income they can. In many countries, the private sector may include less-formal operations which may operate outside of public scrutiny but nevertheless perform valuable services.

### 1.3 Public, private, and non-profit sectors working together to provide paratransit services

• Public regulation of private operators: This approach is common around the world. For example, a transport ministry may regulate and monitor fares, establish vehicle safety and maintenance standards, set up standards for driver training (of special importance to paratransit operations, as described in Section 6), and levy fines and taxes. See the discussion at 1.5 for more about how regulations of various kinds can impact paratransit services.

• Public subsidies: This is a feature of most of the city paratransit systems described in case studies in this guide. Subsidies can come from many sources and may be used to offset low passenger fares, for vehicle and other capital procurements, for provision of maintenance or fuel, or for other purposes. Go to Section 3 on funding sources for more information.

• Contracting out services: The public sector contracts with the private sector to provide paratransit services in several of our case studies. Private or non-profit operators can bid to operate a service, based on costs per mile or per hour or per passenger or other indicator. All the fares are transferred to the public entity. Paratransit services in the USA generally follow this model. Alternatively, in some cases, the bid is for a “franchise” or “concession” in which the winning company keeps all the fares, which may be set by the public entity or the

company in different cases. Contracting out keeps the public entity "at arms length" from the private operator, hopefully combining the advantages of both public and private sector involvement. One problem with this approach is that the private operator may have to amortize the capital costs for vehicles and other assets over a contract period of, say, 3-5 years, since funding may be uncertain after the contract expires unless there is a robust second-hand market for used vehicles. One way to address this problem is for the public entity to lease the vehicles and other assets to the private company. Leasing may sometimes have advantages for non-profit agencies as well, as described in Section 10.

• Associations of private operators: Metered taxi companies and informal operators of small vehicles may form associations of various kinds to have a unified voice in dealing with the public sector, to bid on contracts, to enforce a minimum or improved level of performance, to seek external funding, to plan services with the public sector, to provide a pool of vehicles for operators to lease, or to provide a shared maintenance or garaging area. In some cases, these advantages may be offset by the association being taken over by leadership which is not responsible, or is unlawful in its dealings with the public sector. The issue of association building requires study and work to enhance the potential advantages.

• Coordination and mobility management: The public sector can be a "mobility manager" for a city or region by identifying paratransit providers, potential markets, and gaps in service; and by providing technical expertise and exchanging ideas, or by promoting shared assets such as vehicles, maintenance, training, or fueling facilities. This far-sighted approach is of special importance in order to start up or scale up paratransit services for mobility-impaired persons.

• Demand management: This approach is often seen as fostering sustainable cities by promoting staggered work hours, regulating development to make it easier to use public transportation, or providing better real-time information to the public about all transport modes. In the world of paratransit services, demand management could also encourage social service agencies to stagger their hours to even out the "peak hours" for paratransit services. If agency A serves its clients from 9 a.m. to 3 p.m. and agency B serves its clients from 11 a.m. to 5 p.m., their paratransit needs might be met with fewer vehicles and drivers, which may mean a lower cost per trip or the ability to make more trips, to the advantage of all concerned. More on this in Section 10 and Section 11, and the case study from France.

Non-governmental organizations (NGOs) and other not-for-profit agencies operate paratransit services incorporating *various* service models. They are often the main providers of paratransit services in many regions. See Section 10 for more information.

This discussion of paratransit service models is based on materials prepared by Richard Schultze. For a more in-depth discussion, we encourage you to go to www.globalride-sf.org/paratransit/supplement/servicemodels.html for his expanded section on this topic.

### 1.4 Connecting with public bus and rail transportation: "intermodality" as a supplement to other service models

In many countries and cities, there is an encouraging trend toward providing bus and rail services which are more accessible to persons with disabilities, women, visitors, children, and other passengers who may find themselves mobility-impaired when trying to use public transportation. For example, most of the largest cities in Latin America are building or

operating Bus Rapid Transit (BRT) systems which provide greater accessibility for all their passengers. Similar progress is beginning to be seen in several Asian and African cities. Paratransit services in various forms provide "feeder service" to BRT corridors in the downtowns of major cities, ranging from Mexico City's Metrobús BRT to Cape Town's MyCiti to Ahmedabad's Janmarg. They also provide feeder services to accessible subway and commuter rail lines, ranging from the elevated Delhi Metro to the London Underground to the São Paulo Metro. Increasingly, paratransit for mobility-impaired persons needs to be considered as part of this larger "mix" of services in order to include those passengers with disabilities who *can* transfer to accessible fixed-route lines. This provides two major advantages:

***Auto-rickshaws are lined up at top at a Janmarg BRT station in Ahmedabad, India*** – Photo by Jamie Osborne

(1) The world's emerging megacities are so huge that cross-city paratransit trips become very expensive and very time-consuming, which is especially a concern for passengers with disabilities. With more accessible mass transit systems, there are clearly advantages to providing paratransit connections directly to those rapid transit systems which provide accessible, fast, and lower-cost service.

(2) By connecting with accessible bus and rail services whenever possible, limited paratransit resources can be more efficiently focused on the services *within* different city districts, zones, or neighborhoods, with a greater focus on transporting more mobility-impaired passengers to schools, universities, shopping centers, medical centers and other key sites *within* each district, even if cross-city trips are less available. Especially in large cities, we recommend careful consideration of the possible advantages of this "zone" or "district" service model in order to increase the amount of paratransit service. This approach enables trips to be far shorter, so more passengers can be transported per hour at lower cost. Services could then be scaled up to possibly include more trip purposes if the service is subsidized by a municipality. But there are tradeoffs, especially if this model, that limits service to within specific zones, is used to *replace* a current service which permits passengers to travel all over the city. Some current passengers may then complain, with possible political repercussions. These passengers may correctly point out that transferring to accessible bus or rail lines may in some cases be tiring or not usable due to their disabilities. But if a *new paratransit service* starts up by using a model with trips limited to specific zones, there will probably be fewer complaints and more people may ultimately benefit.

### 1.5 Regulations and their impact on paratransit service models

Too little regulation can be a bad thing. So can too much. On the one hand, regulations should be provided and enforced to assure that paratransit services are safe and efficient. On the other hand, regulations may increase the cost of providing service and too much regulation can be counterproductive.

General comments about some positive uses of regulations

People usually think of regulation as a function of city or regional or national governments. But even in the absence of government regulations, transit agencies or associations of transit

companies or owners can self-regulate, as can associations of NGOs and other non-profit providers who operate vehicles to serve their clients. The requirements of international or other donor agencies may also serve the function of regulating paratransit services in helpful or negative ways.[1]

Regulations can impact different actors (stakeholders) in different ways.

(1) Regulations can help *paratransit passengers* by establishing reasonable fares, enforcing speed limits and standards for road safety, and assuring that vehicles are licensed and have safe brakes and headlights as well as safe wheelchair ramps, lifts and securements. And they can prevent discrimination against one or another category of passengers. Regulations can also establish minimum standards for insurance, driver training, licensing drivers, and preventing drivers from abusing passengers or driving while intoxicated or under the influence of drugs.

(2) Regulations can help or hinder *taxi, mini-bus, auto-rickshaw, and other paratransit companies* as they limit or foster the number of competing providers in a city or on a particular route. Regulations can provide lower custom duties or other benefits to help companies pay for the extra procurement and operating costs of accessibility features on their vehicles, and by establishing fares or providing subsidies that are high enough to provide a well-operated company with the profit they need to stay in business. They can provide competing companies with a "level playing field" by enforcing equal standards for everyone.

(3) Regulations can help *drivers and other paratransit employees* by establishing minimum wages, safe working conditions, and consistent paydays.

(4) Regulations can help *investors* by enforcing contracts, by providing incentives to invest in paratransit vehicles or facilities, and by protecting returns on investments through predictable and transparent methods that result in predictable pricing of road use and protection from any corrupt officials or police.

(5) Regulations can help *governments* with needed revenue streams from provider fees, licenses, and taxes.

(6) Regulations can help *create sustainable environments* by reducing air pollution and traffic congestion, or by limiting noise pollution (for example, by drivers who constantly use their horn).

<u>What can go wrong?</u>

Any one of the positive features noted above can be subverted by a lack of transparency or integrity in the promulgation and enforcement of regulations. Excessive bureaucracy and paperwork, corruption, bribery, or "playing favorites" among competing companies can

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1 An example of a regulation that did not promote paratransit provision was experienced by one of us (Rickert) when using USA government funds to foster paratransit services by social service agencies in another country twenty years ago: The "buy American" regulation for vehicles ended up making it impossible to buy any vehicles at all, due to the expense and complexity of purchasing, shipping, and maintaining a "made in USA" product when multiple (and in this case less expensive) vehicles were available locally for immediate purchase in the recipient country, with inventories of parts on hand for maintenance. Similar provisions may also be found in aid requirements of other wealthier countries.

subvert the role of the market and ultimately harm the ability of everyone -- and especially persons with disabilities -- to access public transport and paratransit services.

Unenforced regulations are largely useless and breed cynicism by all the actors with a role in providing paratransit services. Regulatory agencies must have the capacity to carry out their responsibilities. For example, transit laws and regulations require a sufficient number of transit police to enforce these laws and make them meaningful. And regulators, police departments, and other municipal agencies must be shielded from political pressures which make it impossible to carry out their duties.

Can regulations enhance paratransit services with commercial vehicles?

When consistent and fair legal enforcement of contracts is available, it is usually best to try and rely on competition to assure the efficiency of private sector paratransit providers in a well-regulated market-driven environment. Some unregulated service can be especially difficult to access on the part of elderly or disabled passengers. Many of the city paratransit services studied in this guide utilize regulated private sector providers (companies) which are subsidized with public funds.

The above discussion of regulations is based on materials prepared by Richard Schultze. Go to www.globalride-sf.org/paratransit/supplement/regulations.html for his more detailed discussion of this important topic.

### 1.6 The impact of new technology, in combination with low-cost smaller vehicles, to create service models to increase affordable paratransit services

Taxis


Millions of persons with disabilities live in dense urban areas. In many cases, taxis adapted with ramps and wheelchair securements have efficiently provided these services at all hours, while in areas with fewer taxis the use of vans or mini-buses traditionally has been advisable. Taxi fleets already provide vehicles, drivers, maintenance, dispatching and other service elements. Even when not wheelchair accessible, taxis equipped with swivel seats can serve 90% of disabled passengers. (See case study of Moscow Social Taxi.) Their use may eliminate the need to "reinvent the wheel" by creating a new specialized service with dedicated vans or mini-buses which frequently must make longer trips in order to serve fewer passengers in a dense urban area. Incorporation of taxi companies into municipal paratransit systems is an activity that can benefit from the use of a "paratransit broker." The broker can serve as a coordinating agency to select taxi and/or commercial or NGO van or mini-bus contractors through competitive bidding or open-entry agreements with these private or non-profit service providers. This mix of vehicles can then serve different passengers in different situations or in neighborhoods with different densities. This model is used by some USA cities, including San Francisco (photo above), metropolitan Los Angeles, and Pittsburgh.

Global Positioning System (GPS) technology, mobile phones, and related technologies are increasingly in use with taxi fleets. For example, the London Taxi App, or the "Cabulous" app, which use GPS technology, enable someone in need of a ride to see where nearby taxis are located in real time and then talk directly to the driver. Other technologies, such as Google's Wallet app, or Isis (AT&T, Verizon, and T-Mobile) enable electronic payment to be made on the spot.[2] Smart-card or bank card payment systems may enable governments to more readily and cheaply provide direct subsidies to disabled passengers. These technologies will gradually become less expensive over time. They clearly make it easier for those disabled passengers who can afford taxis and can benefit from the convenience of a call center with central dispatching of taxis.

Auto-rickshaws

The use of motorized auto-rickshaws (see case study below), cycle-rickshaws and similar vehicles charging lower fares should also be considered where possible. Such vehicles may be usable by most persons with disabilities, including those wheelchair users who can safely transfer to the passenger seat provided space is provided to safely carry a folded wheelchair. Auto-rickshaws are found by the tens of thousands in many Asian countries and in some regions of Africa and Latin America as well. Many persons with disabilities currently rely on them. As fuel prices increase, they will probably also find greater acceptance in Europe and North America. India alone manufactures some 400,000 auto-rickshaws every year.

Entrepreneurs, city officials, and larger NGOs should consider GPS and mobile phone technologies that open up new possibilities for less-expensive and more convenient services using auto-rickshaws. These services increasingly use call centers that are especially helpful to passengers with disabilities who need to be picked up where they live. Some service models invite participation by existing owner-drivers of auto-rickshaws, while others utilize vehicle fleets owned by a company.

An auto-rickshaw entrepreneurship forum sponsored by EMBARQ included a focus on social benefits, noting that "Social equity by way of accessible and affordable transportation choices for elderly, women, disabled, and children is a core aspect of promoting sustainable transport services. Fleet DAR (dial-a-rickshaw) services can help meet this goal by providing household access to auto-rickshaws through centralized calling facilities."[3]

Entrepreneur-driven auto-rickshaw fleets with call centers have grown rapidly in India. For example, commercial startups utilizing call centers are reported in the Indian cities of Chandigarh, Delhi, Gurgaon, Ahmadabad, Rajkot, Vadodara, Mumbai, Pune, Bangalore, and Chennai. Cycle-rickshaw call centers are reported in various cities in Punjab, organized as a non-profit benefitting the rickshaw drivers. These call centers usually connect with fleets of vehicles that utilize on-board GPS units and provide mobile communication between drivers and the call center. Some call-center operations charge a surcharge (called a "service charge" or "convenience charge") on the prevailing auto-rickshaw fare, which still is

2 "On the spot" payment is also enabled when disabled passengers use "traditional" debit cards. For example, in San Francisco and other cities in the USA, eligible persons with disabilities subtract their fares by swiping a debit card used in conjunction with mobile data terminals in taxis. The system in San Francisco paid for itself in the first year by eliminating unauthorized use of subsidized services, for example by assuring that services were only provided in authorized service areas. The data also provides complete information to review and analyze system performance.

3 EMBARQ, announcement of Feb. 10, 2012, Rickshaw Rising entrepreneurship summit in Mumbai

considerably lower than that of taxis. This surcharge may be reduced for seniors and persons with disabilities (for example, Rickshawale in Mumbai). Services may emphasize security for women, children, and seniors (e.g., Radio Tuk Tuk in Gurgaon or a similar service in Rajkot). Auto-rickshaw drivers may receive special training to assist seniors and persons with disabilities (e.g., Any Time Rickshaw of G-Auto in Ahmedabad). Call center startups need to pay special attention to driver training, to assure courteous and competent treatment of their disabled passengers. They may need to deal with daunting regulatory environments.

The advantages of auto-rickshaws include lower costs and thus lower fares, a low-floor design, and in some cases the ability to accommodate folding-type wheelchairs. However, safety concerns increase with the use of smaller vehicles such as auto-rickshaws. There is especially a need for research into alternative methods for the use of seat belts. Mini-taxis (for example, Tata's *Nano*) may be able to charge competitive rates with auto-rickshaws and provide a different set of advantages and disadvantages in terms of accessibility.

Long-term implications

If a person with a disability can communicate *directly* with a nearby taxi or auto-rickshaw, the scheduling and dispatching support structure can be reduced or eliminated.

GPS, smartphone, and payment technologies may enable a restructuring of many paratransit services in developing regions in years to come. The infrastructure for these developments is already in place in many locales due to the rapid expansion of mobile phones in the very areas where land-line phone infrastructure is not well developed. This type of cell phone expansion will probably trend toward smartphones with paratransit-related applications. However, there may still be a need for an integrating agency "to put it all together" in terms of certifying eligible clients if fare subsides are offered, or if incentives are needed for drivers or companies to provide a higher level of service to disabled passengers.

These approaches may be assisted by regulatory reforms in the auto-rickshaw permit process and by reforms to road safety, including the segregation of auto-rickshaws from other motor vehicles in particularly congested areas.

Summing up, new technologies and the use of fleets of small commercial vehicles provide a breakthrough in creating higher-volume and lower-cost mobility for disabled persons, even if the requirements for such a service may sometimes require use of a brokerage or other agency to integrate and coordinate the different elements of the system.

Governments unable or unwilling to directly subsidize the paratransit fares of low-income persons with disabilities may wish instead to subsidize access features and other conveniences to make vehicles more accessible and to better train drivers serving passengers with disabilities. Not the least of these features is the development of more accessible auto-rickshaws and cycle-rickshaws that can be utilized by those wheelchair users who cannot transfer to a regular seat during travel. Typically this will focus on designing the rear or one side of the vehicle to be hinged as a ramp, which may require extensive re-design of a sub-fleet of more specialized vehicles.

## Case study: AUTO-RICKSHAWS IN NEW DELHI

***Manish Gupta of New Delhi illustrates the relative ease of entering a motorized low-floor auto-rickshaw, using vertical and horizontal handholds at a test session.*** - Photos by AEI

Three-wheeled motorized auto-rickshaws are a major public transport mode in Asia, Africa, and other regions. A recent study by EMBARQ* reported that six Indian cities with a combined population of 45 million were served by some 330,000 auto-rickshaws. Metropolitan New Delhi alone has 80,000 "autos." An 8 km (5 mile) trip by auto-rickshaw in New Delhi costs 58 rupees (=US$1.32), while even the least-expensive taxi service would be almost twice as much. For persons with disabilities, often among the poorest of the poor in cities such as New Delhi, any method of improving travel by this mode is important.

Agencies in India have shown increasing interest in auto-rickshaws. Svayam, an initiative of the S.J. Charitable Trust in New Delhi, is promoting the potential of auto-rickshaws to provide lower-cost door-to-door services for persons with mobility and sensory impairments. A test session (photos above) was organized by Svayam in late 2011 at GNB Motors Ltd. in Faridabad, a suburb of New Delhi, at the suggestion of Access Exchange International. The test session provided an opportunity to more rigorously demonstrate the potential of this mode. Two models of auto-rickshaws were tested by volunteers with disabilities, one of whom was semi-ambulatory, using a crutch, while the second volunteer used a wheelchair. Not surprisingly, the larger model proved easier to use by disabled passengers.

Auto-rickshaws have rather low floors and the photos at top show that existing hand rails provide significant help to a disabled person boarding the vehicle. Another photo (inset)

shows the additional hand grasps recently added to auto-rickshaw models. Work is needed to test different low-cost modifications, including the value of one or more simple two-point "airline style" seat belts or a more expensive three-point retractable seat belt. Possible changes in the bulkhead behind the driver could provide more room to enter the vehicle. Added padding to protect the knees and legs of passengers could be considered, as well as a device to help secure crutches or walkers. These or other modifications are part of the larger context relating to auto-rickshaw safety. Auto-rickshaws may be safer than bicycles or motorcycles, but offer less safety than automobiles or vans or mini-buses. Fortunately, New Delhi's auto-rickshaws have a top speed of only 50 km/hour (30 mph) and a cruising speed of 35 km/hr (22 mph).

Driver behavior is also a concern. Training and other support for drivers is needed. In turn, strategies are needed to enhance the ability of auto-rickshaws to provide these somewhat more specialized paratransit services. One approach would be to modify all auto-rickshaws with low-cost changes. Another approach would address the complexities of a "sub-fleet" of adapted auto-rickshaws with better-trained drivers and an operational model that addressed scheduling, dispatching, and the use of call centers to request services. This approach, which is already being tested in New Delhi, also would lend itself to the possible use of subsidies in some cities to better enable qualified disabled persons to use the service. In all events, other alternatives are needed for those disabled passengers who cannot transfer to a passenger seat. The use of auto-rickshaws must also focus on creating an environmentally sustainable service, for example with less-polluting 4-stroke engines instead of the 2-stroke engines used in some cities, as well as the use of CNG (compressed natural gas) as an alternative to diesel fuel.


Another concern is that only some models of auto-rickshaws have the interior space to accommodate a folded wheelchair behind the passenger seat, in a weatherproof compartment with a rain shield. Alternatively, it is possible that a device to hold a folded wheelchair could be affixed to the rear of the exterior of the vehicle. However, no auto-rickshaw model we have seen would permit a wheelchair user to enter the vehicle in the wheelchair, although this could be done by means of complex modifications that would include hinging the rear or side section of the vehicle.

***Folded wheelchair in auto-rickshaw at test session.*** - Photo by AEI

* EMBARQ, *Sustainable Urban Transport in India: Role of the Auto-rickshaw Sector* (2012), prepared by Akshay Mani, Madhav Pai, and Rishi Aggarwal

**This case study and the preceding discussion on new technologies were prepared by Tom Rickert of Access Exchange International. Appreciation is expressed to Svayam, GNB Motors Ltd., disabled volunteers Manish Gupta and Alok Sikka, and Dr. Kit Mitchell of the UK, all of whom contributed to the success of the test session. We also thank Akshay Mani and his colleagues with EMBARQ in India for personal correspondence.**

# Section 2: ELIGIBILITY SCREENING

***Purpose of this section:*** *To introduce key issues and processes to assure that subsidized paratransit services reach those who most need them.*

The use of low-cost market-driven paratransit modes, such as the example which is described in the case study above from New Delhi, may hopefully help paratransit to become more available for seniors and persons with disabilities, with little or no eligibility screening. In addition, as governments become more aware of the negative "social costs" of not providing transport services to persons with disabilities, it may be hoped that funds will be provided to further subsidize specialized paratransit services.

Currently, however, eligibility screening remains a critical element for agencies that strive to serve those who are most in need of paratransit service.

In the United States, the Americans with Disabilities Act (ADA) law provides clear and structured requirements regarding who is eligible to receive paratransit service.[4] However, in less wealthy countries, some of these requirements may not be relevant or there may be others that are more critical to the program's effectiveness.

The ADA requires that paratransit service be provided to all those individuals whose disability *prevents* them from using fixed-route service. The word "prevents" is a high threshold that is necessary when viewed in the light of another key requirement of the legislation, that no individual can be denied a trip based on trip purpose or a number of other factors. In other words, if transit agencies have to provide paratransit for a very wide range of trips, there needs to be a mechanism in place to control access to that program. That mechanism is the eligibility process that flows out of the legislative requirements. This is the key tool provided by the law to enable transit agencies to have a measure of control over the demand for subsidized paratransit services, and therefore over costs.

Most paratransit providers who are reading this guide do not have the financial resources that are available in the USA for paratransit provision. Paratransit providers in our case studies often choose to limit eligibility based on type of disability, income level, age, or trip purpose (e.g., to work, to rehabilitation services, to special education). Each of these limitations serves to constrain the mobility of the disability population, yet the lack of financial resources may require these measures in order to ensure a fair application of the policy.

Given how valuable this service can be in the lives of people with disabilities, decisions about eligibility can be highly emotional and politically charged. For this reason it is important that substantive input be gained from *community leaders* in how to design the eligibility program.

It is important that a *passenger certification process* be developed that is as objective and fair as possible. Where professionals with experience in rehabilitation are present, it would be advisable to involve a physical or occupational therapist in the development and possibly the implementation of the eligibility process. Medical personnel can also be used, although they tend to have less relevant experience in assessing functional abilities to ride a bus or train than those in the rehabilitation field.

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4 For a synthesis of ADA paratransit eligibility certification practices in the USA, go to Richard Weiner's report at http://www.transitaccessproject.org/InternalDocs/Paratransit/tsyn30.pdf

Once the overall eligibility policy has been decided, those involved in either the development of policy or in service provision will need to create *criteria and procedures to help interpret these policies*. For example, in the USA there are a number of key eligibility categories that could be adapted in other countries. Persons are eligible for paratransit if their disability prevents them from getting to or from a bus or train stop, from boarding or getting off the vehicle, or from being able to ride on the bus. This can be due to either physical or cognitive reasons, or because of a visual disability.

If the resources are available, the paratransit provider may wish to request that an individual come in for a *mobility assessment*, in which she or he tries out a replica of a bus entrance at a bus stop to test the functional abilities that would be needed to take a bus or train. This replica does not require substantial equipment. However, since it is intended to replicate a real world environment, it could be conducted in an area where there are street crossings, traffic noise, wide streets, and other barriers that may prevent a person with a disability from getting to a bus. If a bus stop is available near to the assessment site, the individual can also be accompanied by an assessor to determine their functional abilities.

Assuming that the number of people with disabilities who would need paratransit service in any less-wealthy country would far outstrip the capacity of the service, the need to incorporate a “means” test seems to be inevitable. In other words, while most people with disabilities in less-wealthy countries are likely to be poor, those who are the poorest are likely to be in the greatest need and have the least mobility alternatives. As such, installing a mechanism for determining an individual’s financial means may be the first threshold in the installation of a new eligibility policy. On the other hand, some systems may decide that it is critical to ensure that even a small segment of the disability community has access to work, even if these are not the members of the community who are in the greatest financial need.

While eligibility assessments may vary depending on the context in which they are being implemented (such as availability of transit, accessibility of the environment, financial resources), procedures must be developed to ensure that this critical resource is distributed in the fairest possible way. If not, situations may arise in which only a small fraction of the disability population has access to paratransit service, even though some of those individuals may have alternative mobility choices that are not available to the majority. Some of these concerns are touched upon in the Cape Town case study, below.

Especially when eligibility requirements are changed for an *existing* paratransit system, it should be anticipated that decisions surrounding the design of the eligibility screening policy will be difficult. Nevertheless, they may be necessary to ensure mobility for those who need it the most. The best policy may be to begin with eligibility requirements that can later be relaxed if permitted by the capacity of the system. This will give managers an opportunity to learn from experience as the system grows, while not having to explain to public officials why they may need to cut back on service for some categories of users. It is always easier to add service than to take it away!

**This section was prepared by Richard Weiner of Nelson\Nygaard Consulting Associates in San Francisco, USA.**

# Case study: CAPE TOWN Dial-a-Ride


## Introduction

Cape Town is the second largest city in South Africa, with a population in the metropolitan area of over 3.3 million residents. The Cape Town Dial-a-Ride (DAR) service, while very small by western standards, is possibly the largest public demand-response transportation system in Africa. DAR was also the first public demand-response service established in South Africa. In the context of the transitional period after apartheid in which it was founded, Cape Town's DAR program managed to straddle the divided communities that formed a part of the Cape Town metropolitan region, but due to economic realities – and to continue to apply pressure for mainstream transport to become accessible – it has always only addressed the needs of a tiny minority of the disability population. In this regard, it is not that different from many communities in the developing world.

Cape Town is now creating an accessible Bus Rapid Transit system, supplemented with accessible feeder routes to the trunk line corridors. In the future, accessible fixed-route bus services may become an increasingly important factor for disabled residents of Cape Town.

## History

In the early 1990's a small door-to-door transportation program was operated by the Cape Town Association for the Physically Disabled (APD). With the prospect of South Africa's application to host the 2004 Olympics, two organizations in the disability sector, APD and the Cape Town Society for the Blind, initiated discussions in 1998 with the municipality to increase the availability of accessible transportation options in the region. As a result of these efforts, the City became a champion of accessible transportation, and, with the provincial and national government contributing financially to the effort, initiated a small paratransit pilot program that consisted of four vehicles. The pilot was initially limited to two vast and largely impoverished areas in the Cape Flats area east of the city centre. APD was designated as the administrator of the program. The City's public transit operator, Golden Arrow, was tasked with providing the service. The pilot program was intended to last one year. It was then extended for another year, before an additional four year extension was put in place. The City provided a consultant to help in the development of program policy.

## Factors that contributed to Establishment of the DAR Program

Initial Business Plan

As described above, the program evolved due to external circumstances, such as the increased priority placed on meeting the needs of the disenfranchised population in South

Africa. While there was no specific business plan in the early stages of the program, with no estimation of the potential demand, those involved in planning the program made decisions based on existing conditions and a recognition that the program could only address a small proportion of the total need.

At the time of this report, a more formal business plan is being drafted, with oversight from the DAR Advisory Group and input from a broad range of city and provincial departments. The plan will include the following elements:

- Review of contracting regulations
- Policy review
- Verification and update of passenger database
- Review of fare structure
- Exploration of partnerships with the private sector
- International benchmarking
- Coordination with Cape Town's rapid transit and public transport systems
- Driver behavior and training
- Investigation of a more sustainable funding model

**Service Data**

Ridership

DAR provided about 114,000 one-way trips in 2011, or 400 trips on an average weekday.

Fares

For trips that exceed 15 km, passengers pay 5.50 rand (which at the time of the site visit was the equivalent of US$0.80). Shorter trips were slightly less, at R4.50. Accompanying assistants are expected to pay the same fares as the registrants. While these fares are much lower than western countries and cover less than 3% of the cost of the trip, they represent a significant investment for riders in the context of South African salaries and welfare benefits. While the fares were originally set to mirror fixed-route fares, paratransit fares currently lag behind as a result of recent fixed-route fare increases. There is therefore little incentive for riders to try fixed-route service if this is at all an option given their functional abilities.

Operating Costs

The cost of providing DAR service was approximately R20M (or about US$2.8 million) in 2011, which is shared equally between the provincial and city governments.

Funding Sources

Initially the program funding sources were equally divided between the national, provincial and city governments. However, two years after program initiation, national government support was not renewed under a new contract.

Organizational Structure/Staffing

The service is provided by a staff of approximately 65 individuals, including one manager, two dispatchers, and primarily drivers making up the balance of the staff.

**Service Parameters**

DAR service is provided on a curb to curb basis, although on an informal basis many dri-

vers do provide assistance to riders' front doors. The majority of trips (63%) are less than 15 km one-way, although 4% of trips exceed 36 km. The average trip length is 17 km. Riders are required to book their trips up to seven days in advance, although the majority of riders have standing orders. For those who do need to call for trips, there is reportedly a problem with getting through to the operators because of the limited number of phone lines. Drivers' schedules (manifests) are generally prepared one to two days in advance.

Service begins at approximately 5am, and ends at approximately 7:30pm, reflecting the fact that the service is not intended for social or recreational purposes, but rather for work. This is also reflected in the hourly fluctuations throughout the day. There appear to be three peak hours of travel on the DAR service, between 6am and 6:30am; between noon and 1:30pm; and between 4pm and 5pm.

**Service Quality Evaluation and Monitoring**

The DAR operation has been provided by three different contractors over the past thirteen years, and there have been challenges with all three providers. One of the key issues faced by the DAR program has been related to service quality, particularly operator no-shows, which averaged over 400 per month in the first half of 2011. This apparently was partially due to the lack of monitoring on the part of the jurisdictions. As a result of the implementation of a service monitoring program in 2011, and the assignment of this responsibility to a City staff person, the operator was subject to significant performance related fines. Besides monitoring operator no-shows, the staff person conducts on-route monitoring of vehicle road worthiness and cleanliness as well as driver conduct. Within a few months of the implementation of the monitoring program, service reportedly started improving with a reduction in operator no-shows. The level of fines imposed upon the operator then declined substantially. The city also monitors the quality of the call centre function, including the time taken to answer calls, vehicle scheduling, and schedule adherence. The involvement of an active advisory committee has also helped improve the monitoring of the operator's performance. In addition, the City's Transport Information Centre has a complaint system in place, which can lead to sanctions against drivers for poor performance. Apparently complaints have declined since the increased monitoring by City staff was implemented.

Vehicles reportedly now maintain a 96% level of on-time performance. The window for "on-time" pick-ups and drop-offs is 15 minutes, which is relatively narrow for a paratransit program serving residents in areas with poor road conditions and congestion.

**Fleet and Maintenance**

DAR services have increased in stages from an initial fleet of four to a current fleet of thirty vehicles, including three spares. Although no vehicle replacements were necessary during 2011, the fleet is quite old and 95% of the vehicles have over 300,000km on their odometer. The fleet currently consists of Iveco vehicles and, to a lesser extent, Quantums.

**Registration Process**

Selection of program beneficiaries can be a politically charged element of any paratransit program, as it results in the distribution of a valuable resource to a limited number of people. In the early stages of the DAR, program participants were selected from APD's

caseload in terms of the transportation needs known to program social workers. Of the 600 APD program participants, the 40 who were selected for DAR service eligibility were generally individuals who were capable of working. In some cases they had even been offered jobs but were unable to travel to their places of employment due to the lack of an accessible mode. One early adopted policy that appears to have created problems during the course of the program was the decision that all workers were granted temporary eligibility, on the assumption – particularly for people such as those with visual impairments – that they would be able to receive travel orientation in order to independently use fixed-route transit and not be reliant on DAR once they became gainfully employed. Since the market rate cost of accessible transportation is usually very high, it generally is beyond the reach of most people with disabilities, including those who have low-paying jobs. This policy was revisited and most riders were allowed to stay on the system.

In contrast to the early years in which applicants were generally known to social workers and other professionals who had worked with them, the system is now more widely publicized and the city issues a “call for applications” which is publicized in daily and community newspapers. The application process is handled through the city’s transport and health departments. Until fairly recently, applications were signed by a medical practitioner and applicants were only required on an as-needed basis to participate in an in-person functional assessment. This assessment was conducted by an occupational therapist from the University of Stellenbosch who was under contract to the city. The assessment appeared to be fairly simple, including requiring ambulatory applicants to climb up a “step box." During 2011 this approach was rarely used. Informants indicated that this was due to a perception that “the assessment was taking away people’s rights and reinforcing their sense of exclusion.” DAR was in the process of revisiting their eligibility certification process at the time of writing of this report but apparently this was not implemented.

There are currently (late 2011) about 6,700 registrants on the DAR system, of whom about 84% have a physical disability, 7% visual, 5% “mental and intellectual,” and the remaining 4% are registered on the basis of age. Only a small proportion of the registrants actually receive service, with an estimated 257 regular riders and 131 occasional riders being served in 2011. The vast majority of trips (80%) are for work purposes, followed by school (10%) and medical (5%). An overwhelming proportion of the riders are wheelchair users – 72% - in contrast to systems in North America where the proportion is more likely to be in the 15% - 25% range.

**Community Input**

An advisory committee has worked with the DAR from the earliest stages of the program. The committee consisted of members of the Western Cape Network on Disability, that represents NGOs from all the disability sectors. More recently, the city has committed to having the group meet on a regular basis with the City Council.

**Challenges and Future Plans**

Access to Other Transport Modes

Cape Town has had a very extensive but largely inaccessible transit system, with 120,000 daily bus riders, and 315,000 daily train riders. Golden Arrow, the fixed-route bus provider,

has 25 low floor vehicles, but there is reportedly very limited awareness of the accessibility features of these buses in the disability community. Three metered taxi companies have accessible vehicles in their fleets, including one that has 15 accessible vehicles, but the meter rates are unaffordable to most Capetonians. The current focus is on the newly planned IRT (integrated rapid transit) service.

Fortunately, Cape Town's MyCiTi Bus Rapid Transit system is now running accessible trunk line service, with plans for additional trunk lines. More than two hundred accessible feeder line bus stops are served by 190 low-floor feeder buses.

The City is also currently planning on a number of new paratransit initiatives. These include the establishment of a Disability Forum which will help guide the development of a broad range of policies, from the rights and responsibilities of passengers, to trip cancellation policies, to the development of complaint procedures and an enhanced eligibility process. At the end of 2011, the City was also in the process of soliciting proposals for the next contract. The City will encourage financial contributions from some of the larger employers of DAR riders, and also the introduction of more flexible work hours for those employees.

Sexual harassment

This has reportedly been a significant problem in the past, but is currently being carefully monitored. There were apparently a number of cases of drivers sexually harassing riders, particularly women with developmental disabilities. This reflects the larger problem of rape in South Africa, which has one of the highest rape levels per capita in the world. Significant publicity in recent years has resulted in steps that are being taken to address this crisis, including within the DAR program.

**For consideration by paratransit practitioners in other countries**

Cape Town's paratransit system continues to adapt as it faces an array of challenges. In general, most of the elements of international paratransit programs are in place, though there are some variations due to program history and local conditions, such as the almost exclusive use of the program for work purposes and the substantial proportion of wheelchair users. Another concern is the relatively high cost per trip to provide the service, which limits the pool of individuals who can ride. The City estimates that only 4% of current registrants receive paratransit service, and the percentage of people with disabilities who are served is a small fraction of the total.

In recognition of the high cost of paratransit service (and other reasons), the agency has adopted a policy of promoting accessible fixed-route public transit so that people with disabilities who live near those routes will be served in far greater numbers than is possible under DAR. This is a model that could be replicated in other countries, although it fails to serve the mobility needs of the majority of people with disabilities in the sprawling informal settlements who may not be able to even reach the feeder bus routes.

**This case study was prepared by Richard Weiner of Nelson\Nygaard Consulting Associates in San Francisco, USA, based on his interviews with Maddie Mazaza, Daniel Japhta, Jim Stanbury, and Karin Liebenberg in Cape Town and Pretoria, South Africa.**
- Photo from Cape Town by Access Exchange International

# Section 3: SOURCES OF FUNDING

***Purpose of this section:*** *To assist paratransit practitioners who face the daunting task of funding their services, by listing categories of potential revenue sources that may be relevant to* your *country or city.*

Commercial paratransit services are available in some cities for those who can afford the entire cost of such service. These services may be provided by small specialized taxi or mini-bus companies, or as part of a full spectrum of services by other commercial paratransit providers. But such services are completely out of reach for most mobility-impaired passengers unless they are highly subsidized or provided at low cost by smaller vehicles such as auto-rickshaws.

With lower-income passengers, the needed revenues to provide door-to-door services often come from multiple sources. Paratransit systems for low-income disabled persons in major cities in less-wealthy countries are usually subsidized by long-term sources of income, usually from some combination of city, state, or provincial transportation funding to supplement passenger fares which typically only cover a modest portion of the total cost. Our case studies from Cape Town, Hong Kong, Moscow, Istanbul, and São Paulo illustrate this point. Smaller services, usually run by non-governmental organizations (such as disability or other NGOs) are usually funded by donor agencies and individuals.

It is important that city officials, NGO staff, and other practitioners consider the full spectrum of potential funding sources. Some of these are noted below.

### (1) Passenger fares

The fares paid by passengers, even low-income passengers, can become a significant source of revenue for a paratransit system. These fares can vary from no fare at all (Istanbul, São Paulo), to a very low fare as a percentage of total cost (Cape Town, Hong Kong, San Francisco), to a fare amounting to half the cost of the service (Moscow). Some commercial systems that use smaller auto-rickshaws or similar vehicles may provide a low-cost service that might not require fare subsidies. However, governments may find it important to subsidize improved access features on their vehicles or otherwise make the service more usable by passengers with disabilities.

### (2) Different types of taxes and fees to support public subsidies of paratransit systems

- Property taxes are often used in North America by cities or states that fund paratransit out of their “general fund” revenues. (Property taxes in San Francisco, for example, fund a major portion of that city's paratransit system.)
- Another common tax source is an increment to a general sales tax. For example, some cities in the USA state of California use a portion of a transportation sales tax increment specifically for paratransit services. (For example, San Francisco put a ½ cent sales tax increment into place in 1989, with 8% of this tax dedicated to sustain door-to-door paratransit services for persons with disabilities, thus becoming a major source of revenue to sustain these services over the long term.)
- A portion of a hotel tax might also be applied to fund paratransit services which would serve tourists who require accessible vehicles. Many international tourists are older persons who

may plan their tourist activities based on the availability of accessible transportation at their destination. In some cases a hotel tax would then capture some of the added value provided by tourists who utilize a paratransit system oriented to their needs.

- Taxes may also be paid on activities sometimes viewed as negative, and thus sometimes called “sin taxes." Such taxes include
  - a tax on gambling casinos (example, the USA state of New Jersey, where 7.5% of casino tax receipts were dedicated to the state's paratransit services)
  - a tax on lottery earnings (example, the USA state of Pennsylvania)
  - taxes on liquor or tobacco products might also fall into this category
- Transport-related fees could partially or wholly subsidize accessible paratransit services, either because they are related to transportation in some way or because their support of persons with disabilities is viewed as offsetting the pollution, congestion, and noise created by private automobiles. Transportation-related sources may include
  - private automobile or commercial vehicle registration or licensing fees
  - taxes added to parking fees
  - transit impact development fees for new construction, often in central business districts
  - congestion pricing for vehicles entering central business districts, especially during peak hours
  - sales taxes on fuel

**(3) Advertising**

Businesses may wish to pay for their advertisements to be posted on paratransit vehicles. Alternatively, the offer of free advertising on vans and mini-buses donated by commercial businesses may be one factor in a decision to donate the vehicles. See the case study of Persatuan Mobiliti in Kuala Lumpur, which includes a photo of a donated vehicle with the name of the donor displayed on the vehicle, to the benefit of all concerned.

**(4) Revenue sources for paratransit that serves specific government agencies**

- Some cities may be able to fund paratransit services as an integral part of their provision of rehabilitation services for persons with disabilities (Istanbul) or in connection with special education schooling (Curitiba, Brazil; *Ligado* in the state of São Paulo, Brazil)
- Cities with contracts for private sector bus operators may have a system of financial penalties to be paid by operators when they fall short of defined service standards, as part of a larger system of positive and negative reinforcements of contract compliance. For example, Guayaquil, Ecuador, uses funds from such penalties to finance a small system of accessible vehicles to connect with key stations of their Bus Rapid Transit system.

**(5) Fees for services**

- Agencies taking part in a coordinated paratransit system might benefit from payments for use of their vehicles to transport clients of other agencies.
- Social service agencies may wish to enter into contracts with other agencies (either non-profit or for-profit) to provide transportation to their services.
- "Third party" agencies who benefit from paratransit services can be solicited to consider donations or payments to offset paratransit costs. Such agencies include employers whose employees are provided transportation to their work site, or hospitals or schools whose

clients or students are provided with transportation. It is a good idea to negotiate with such agencies *prior* to providing the service. Once the service is under way, these agencies may assume a city or other agency is obligated to continue the service. Also, they may realize that it is not politically feasible to cancel these services.

**(6) Donations and grants from foundations, corporations, embassies and consulates**

Foundations and corporations are a major source of donations for vehicles to assist NGOs, schools, clinics, and other non-profit entities to bring clients to their services. Our case studies from Invataxi (Moscow) and Persatuan Mobiliti (Kuala Lumpur) illustrate this. In the past, these funding sources have usually not been a resource for paratransit services designed to serve larger numbers of disabled passengers for more general purposes. Hopefully, major foundations will begin to see the potential for using their funds to help build the capacity to scale up current paratransit services. Many foundations may wish to avoid providing ongoing operating funding (e.g., driver salaries) but may be more interested in helping to fund capital costs, especially for vehicles or facilities, or funding short-term tasks such as the planning that ideally should go into starting up a paratransit service.

Caution: See Section 10 on NGO Transportation for some of the issues that arise from operating a small fleet of donated vehicles. There is no such thing as a "free" vehicle, in the sense that licensing, fuel, maintenance, and personnel costs must be paid in order to operate the vehicle. Agencies who donate vehicles might in some cases consider helping NGOs to instead lease vehicles -- they could still have the option of having their name on the vehicle during operating hours if a magnetic placard was used on the side of the vehicle or in a window area.

**(7) Grants from international development banks and aid agencies**

It should be kept in mind that development banks – such as the World Bank, the Asian Development Bank, and the Inter-American Development Bank – must respond to the governments that control their funding, usually responding to a direct request from a designated ministry or national department in a country they serve. While a project to leverage the scaling up of sustainable paratransit services in a city or region might fall within their area of interests, these sources may not typically be able to donate vehicles or other material aid. In some cases it may be best to consider an approach to an international aid agency for funding to *plan* a paratransit system to provide mobility for persons with disabilities, or to *plan* paratransit feeder services to new public transit systems such as Bus Rapid Transit or rail systems. Perhaps funding for transfer stations would sometimes qualify. These suggestions are merely ideas from the editor of this Guide.

**(8) Donations from individuals, with San Francisco, USA, as an example**

- Another possible source of income would be a voluntary "add on" for persons paying a municipal or private utility bill, such as a bill for electricity, water, sewage services, and so on. (For example, San Francisco raised $28,000 from 1,500 donations in 1989 by persons paying their bi-monthly water bill. This was a “one time only” effort, and was not considered an ongoing income source.)
- The city of San Francisco set up a “Paratransit Fund” within the city, operated by a non-profit community foundation, to handle the tax-deductible donations of persons who wished to support paratransit services for stated categories of passengers. This kind of appeal

should be supported by a documented list of needs – for example, the number of passengers not currently served and on a waiting list, due to lack of funding. Donations might be solicited on behalf of categories such as “wheelchair users,” “persons needing kidney dialysis,” or “where most needed.”

- Another source of voluntary donations would be "deferred giving" by individuals who provide support for door-to-door services in their wills. In addition, some individuals or their families might care to support transportation for persons who have a specific disability related to one or another disease or condition, perhaps because an individual within their family has such a condition.

Although these approaches were not able to meet a major portion of the funding required in San Francisco, they generated favorable publicity in the media and helped convince citizens of the need for more stable funding sources, helping to prepare the way for voters to approve the sales tax increment noted above.

**General information for entities seeking funding**

- Make friends with public or elected officials who may be able to sponsor legislation to provide tax or other revenues for paratransit services. You may wish to prepare model legislation to make it easier for an official who may not understand how to draft such material. Make sure that government agencies and officials receive full credit for any help they provide.
- Know the funding criteria of any foundation or corporation that you approach. It is seldom a good use of resources to send off mass appeals.
- Larger corporations with specific donor criteria may be more difficult to access than smaller local businesses with a better knowledge of what support could mean for them in terms of good publicity. A lot of time can be wasted approaching potential donors, including corporations, unless there is some reason to believe they will be interested in your service. Also keep in mind that a direct connection with a foundation or corporation board member or executive staff is often a major factor in receiving support.

**This section was prepared by Tom Rickert**

# Section 4: PLANNING & PERFORMANCE MONITORING

***Purpose of this section:*** *To discuss the tools available for initial planning, key decisions needed when planning any paratransit system, and followup performance monitoring to help you reach your goal of phasing in reliable and efficient service while keeping costs under control.*

## 4.1 Planning

No matter how wealthy or poor is a country or region or city, its citizens can work together to set reasonable goals and *to plan for the future*. It is possible to establish a course of action to go from *where you are* to the goal of *where you want to be*. Planning is an orderly way to help reach this goal. By setting specific and realistic objectives, reasonable goals can be reached through a step-by-step process. Planning by public, private, or non-profit agencies usually involves different actors (stakeholders). When planning a new paratransit service, these actors need to

- Establish mutually agreed goals
- Document and quantify (as much as possible) the needs of potential passengers with disabilities and others who will use the system, and the resources now on hand or proposed to meet these needs
- Involve the different actors in the planning process at appropriate levels
- Understand the financial issues
- Develop a step-by-step implementation process, and
- Monitor and evaluate the results of each step

Elements of a planning process

The planning process needs community input. This can include the formation of an *advisory committee* or the use of *focus groups* of potential paratransit passengers, to make sure you understand their needs and whether or not the proposed paratransit services will actually meet these needs. This is also the time to obtain the *support of key persons* needed to assist you in reaching your goals. It is an excellent time to build *cooperative relationships* with different government agencies or ministries who will hopefully want to assist.

The planning process should include *an inventory of existing services* to make sure you understand what paratransit services, if any, are currently available, the fares they charge, the number of vehicles they deploy, and the level of accessibility of these vehicles.

The planning process should help you form an *initial estimate of the demand* for paratransit services, including the categories of persons you hope to serve (e.g., wheelchair users, students needing transportation to special education), the demand for trips by those with different trip purposes (e.g., trips to work, health facilities, and/or schools), and the approximate length of the trips required. Population data and estimates of the number of disabled persons in your city or district may prove helpful, *if* such data is reliable. In general it is best to focus your service on areas with the largest concentrations of elderly and disabled persons, which often are simply the areas with the greatest population density combined with common knowledge about which areas house people with the lowest incomes. Forecasting ridership is usually difficult. The best approach is to make a best estimate, implement service, collect data, and then modify the service as needed.

The planning process should include research about the *regulatory situation*, that is, what rules or guidelines you must follow or seek to modify if needed. The plan should include a strong *funding component*, noting the funding currently available and funding sources which may become available during budget periods (for example, fiscal years) to obtain vehicles or meet other goals. The plan can then provide a *series of action steps*, such as procuring or phasing in new vehicles; addressing fleet management, including garaging and maintenance; driver recruitment and training; marketing to users, and so on. All this may seem apparent to a small NGO or small entrepreneur with a very few vehicles, but some surprises may occur when you estimate the cost of operating and maintaining a fleet even of donated vehicles or look at the problems and pitfalls you may face once the service is initiated.

Larger municipal systems of course face greater tasks. Separate and detailed work plans will be required. Action steps may designate personnel to prepare a work plan or to assign people to do the work and to make sure schedules are kept. Work plans will need to specify the actions required and the person or agency responsible. Funding sources and amounts approved must be allocated.[5]

The planning process will help you to *define your service model* (see Section 1) and make basic decisions about whether you wish to provide door-to-door service or focus on one or more "service routes" to key sites. This is also the time to decide if your service is "many to many" (from many different locations to many different locations), "many to few" (e.g., from many different locations to a few key points), or "many to one" (e.g., from the homes of many students to a single school). Other key questions must be decided during this process:

Who will benefit from your services?

- Is your system open to the general public or limited to taking clients to and from a particular social service agency?
- Will disabled and elderly passengers ride without mixing with the general public, or may riders be combined as needed?
- Will your service be largely focused on persons using wheelchairs, or a broader group of persons with disabilities?
- Will persons with disabilities be able to use the service on a temporary basis? Will tourists be able to use the service? (Tourists may not need subsidized fares and may bring added business to hotels, restaurants, and tourist attractions.)

When will your service be offered?

- Will you provide service every day, or just weekdays, or just weekly or on market days?
- Will you operate 24 hours a day, or during specific hours of each day, or possibly offer added hours for recreational or other trips on weekends, or special hours when needed to go to airports or transit terminals?

Where will you transport your passengers?

- Will you offer transport within *zones* of a large area, or *throughout* the area? (This is a major decision, and zones may offer advantages in large cities.)
- Will your service include "feeder service" to major bus or train stations?

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5 Much of the above material on planning is taken from Access Exchange International, *Making Access Happen: Promoting and Planning Transport for All* (2003).

What trip purposes will be permitted?

- Will you serve any trip purpose or limit your trips to just one or a few trip purposes such as to work, school, or health services?
- Can cultural and recreational trips be added during off-peak hours, as noted in our case studies from Moscow and São Paulo?

How much will you charge for the service?

- Will you charge no fare, a lower fare due to serving very poor persons, or a higher fare to reflect the actual unsubsidized costs of paratransit service? Will you charge a flat rate, or will you charge more for longer trips, or trips to different zones?

What level of specialized services will you offer?

- Will your service be from curb-to-curb (or from the edge of the street outside a residence), or door-to-door, or from within a residence (to assist a person to the vehicle), or some combination as needed?
- Will the service require advance reservations, allow same-day requests, or both?
- If serving a social service agency, will a certain number of passengers be required in order to efficiently use the vehicle? Will each vehicle trip pick up passengers who live near each other in a single neighborhood or along a corridor in order to lower your cost per trip?
- Will you provide attendants for elderly and disabled passengers?
- What weight limits or size limits will be placed on wheelchairs?

How many and what size vehicles will you initially require?

- Your vehicle fleet needs will be clarified as you respond to the questions above and determine the estimated trips per vehicle per hour that are achievable in the planned situation. Other considerations include your current vehicle fleet, if any, and your available and anticipated resources for procuring vehicles. The discussion in Section 5 on vehicles may also help you answer this question.
- Will most or all of your vehicles provide wheelchair ramps or lifts, thus requiring wheelchair securements within these vehicles?
- If you are importing new, used, or donated vehicles, what are the import and customs regulations? Keep in mind that vehicles must comply with regulations or it may not be possible to import them.

For a list of smaller but important decisions, and for more details about planning and performance monitoring, go to Richard Schultze's detailed discussion at www.globalride-sf.org/paratransit/supplement/planning.html.

Note: It is better to start small and learn from your mistakes than to start with a large system and find yourself with higher costs per trip than initially estimated, or criticism in the media due to not being able to keep your promises to disabled customers. No plan can perfectly predict what will happen once you begin – the plan is a necessary tool but the first months of service provide the opportunity to adjust the service to deal with unanticipated issues.

For this and other reasons, performance indicators should be put in place to enable you to monitor the service in order to provide feedback to address problems, take advantage of unanticipated opportunities, and improve the system as time goes by.

**4.2 Performance monitoring**

Getting needed feedback about the performance of a paratransit system can be quite simple with a small one- or two-vehicle system. But every system needs key performance indicators, and larger systems need a sophisticated set of performance indicators to help them monitor and improve the system as time goes by. Goals and standards should be established for each indicator so that managers can assess where they stand with each. Even the smallest paratransit system needs the following data:

- The total number of active passengers during a period such as a month or year (This is not the same as the total number registered, which increases if you do not keep the list up-to-date. You can also calculate ridership by category, such as disabled, elderly, to social service agencies, etc.)
- The number of one-way trips per month, derived from dispatch lists (1 round trip = 2 trips)
- Total vehicle miles per month (from the odometers)
- Total vehicle hours per month (e.g., from driver time sheets)
- From these data you can calculate your cost per vehicle-mile or per vehicle-hour and compare this cost from month to month to see if your service is becoming more efficient.

There are important "quality of service" indicators. Some of the most important are

- On-time performance (% of passenger pickups and passenger drop-offs within a certain "window," for example within 15 minutes of the scheduled pickup time)
- Safety (preventable and non-preventable accidents per 100,000 vehicles kilometers)
- Breakdowns (# per month)
- Wheelchair lift working (% non-operable)
- Travel time (average time passengers are on board vehicles, supplemented by the % of trips over 30 minutes, 60 minutes, and 90 minutes)
- Trip denials (# per month, for example if no vehicles are available to respond to a request for service)
- Complaints and commendations per month, broken down by category
- If possible, the waiting time for telephone requests to be answered, as done, for example, in Moscow
- Further information may be gathered from focus groups with a sample of your passengers, or in some cases from mailed questionnaires (but usually this results in a low rate of return) and telephone surveys (which can be time consuming).

Finally, there are business indicators, including fares collected, income flow, cash flow, balance sheet, debt ratio, shareholder profits, etc. Search engines such as Google will lead readers to definitions of these indicators and entrepreneurs should consult specialized literature for further information.

Proxy counts to measure outcomes

It may be important to gather less direct data to measure the "public good" created by accessible paratransit services. These data often depend on reports about the situation prior to starting the service and then once the service is under way. Foresight is required to begin gathering this data prior to initiating service and then after the service starts up. Proxy counts could include

- Increased education, based on increased enrollment in, e.g., vocational training or special education programs
- Increased health care, based on reports from hospitals, clinics, physicians, etc.
- Increased employment, based on reports from employers of the number of disabled employees, or from sheltered workshops or social service settings
- Independent living, based on increased ability to live in independent residential housing

These types of data are often helpful to donor agencies.

The key is not to generate reports that lie on desks, but to generate reports that are used to improve the service, to compare different types of service, and to communicate with those who fund your system and with the general public to gain good will and political support.

Cities and other agencies contracting out their paratransit service should include performance measures in their written requests for proposals (RFPs). The careful preparation of an RFP is a critically important task and sample requests for proposals can be sought from cities which are experienced in contracting out for paratransit providers. Some flexibility may be advisable, so that potential concessionaires and proposers can negotiate phase-in schedules or modest modifications with transport authorities. Appropriate financial incentives and disincentives based on objective criteria will help enforce contract stipulations. Measurements can include customer satisfaction, complaints, on time reliability, telephone call wait time, and other criteria.[6]

**This section was prepared by Richard Schultze and Tom Rickert**

6 Some of the information concerning the use of indicators and performance measures comes from Access Exchange International, *Transport for All: What Should We Measure?* (2005), available by going to the Resources section at www.globalride-sf.org.

## Case study: ISTANBUL


**Introduction**

Istanbul is an enormous city of some 13.4 million inhabitants, famously connecting the western (European) portion of Turkey with the eastern (Asian) portion. Istanbul has made its fixed route public transport more accessible in recent years. Most tram stations are reported as accessible, as are Metro (subway/elevated) rail stations. Nearly 800 regular buses are equipped with wheelchair lifts, but only eight Bus Rapid Transit stations are reported as accessible to wheelchair users. Certified passengers with disabilities ride public transit free of charge if they have been issued a "white card."

The paratransit service was initiated in 2007 by the health and social services department of the Persons with Disabilities Office. It was started within a district of Istanbul. The director of the service is a medical doctor. An advisory committee meets frequently and includes members with disabilities. The advocacy of a blind elected official in the national government was helpful in starting up the service.

**Service Data**

Ridership

Our most recent data indicates that this service provides more than 100,000 trips per year.

Fares

Service is provided without charge.

Eligibility criteria and registration process

Approximately six thousand residents are registered for the service. The system mainly serves low-income persons with disabilities requiring transport to rehabilitation services in Istanbul. The eligibility process utilizes a panel of physicians, employing a protocol based on functional disability.

Service Parameters

Riders call a single main telephone number to schedule trips, mainly to rehabilitation centers. Scheduling is done manually. Trips are mainly repetitive "standing order" trips to centers providing physical therapy, with vehicles dispatched from satellite sites within districts of Istanbul, although some trips are cross-town.

Operating Costs

The operating budget is approximately US$4 million per year.

Funding Sources

The entire budget is funded by the city of Istanbul.

Organizational Structure/Staffing

In addition to drivers, there are three full-time office staff, plus the director and a full-time scheduler, who are employees of Istanbul Ozurluler Merkezi (ISOM) -- the Center for Handicapped People of Istanbul.

Fleet and maintenance

The system utilizes approximately sixty Ford vehicles, ten with a wheelchair lift and securements, two minivans with a wheelchair ramp, and 48 providing service to ambulatory passengers. The vehicles are owned by the successful bidder for a larger package of disability services funded by the city, with the vehicles becoming part of this larger service. The door-to-door service is part of this larger contract. The funding appears to be sustainable.

**This case study is based on interviews conducted in December, 2010, by Tulay Atalay in Istanbul on behalf of AEI, based on her discussions with Aylin Ciftei and Yunus Karacali of Istanbul Ozurluler Merkezi (ISOM).** - Photo courtesy of ISOM

# Section 5: VEHICLES, WHEELCHAIR SAFETY, MAINTENANCE, FUEL, AND FACILITIES

***Purpose of this section:*** *Smart procurement of vehicles, wheelchair securements, and other equipment and facilities will save money and have a positive impact on how your passengers and the general public view the safety, reliability, cleanliness and comfort of your service. Smart maintenance is needed to get full value from what you pay for. This section also includes some advice on saving money on fuel.*

Some paratransit systems provide their services with fleets composed of mini-buses or vans, as in the case study of Istanbul. Other systems may rely more on taxi-type vehicles, as will be seen in the case study of Moscow's Social Taxi that follows this section. In all cases, paratransit systems need to wisely purchase the appropriate number and type of vehicles at reasonable costs and in the proper condition. They need to keep the vehicles well-maintained while used by the system, and then dispose of the vehicles at the proper time in their lives. Paratransit systems must have safe wheelchair tie-downs and occupant restraint systems and may have other equipment and facilities depending on the size of the system.

### 5.1 Procurement and disposal of vehicles

This sub-section will focus on vehicles used to transport persons with disabilities and other passengers, although large municipal paratransit systems may also have other vehicles used by maintenance, supervisors, and office staff.

You will need to determine what make, model, age and amenities are required by your vehicles. Depending on circumstances, vehicles could include small buses, vans or mini-vans, sedans, motorized auto-rickshaws, or cycle-rickshaws. Horse drawn and other vehicles using animal traction may also be indicated in some rural areas. (Go to www.animaltraction.com for more information.)

*Many factors* go into this decision, including

- The number and seated passenger capacity of the vehicles you need
- The number of vehicles that must be accessible to wheelchair users. Many more persons with disabilities can walk or can climb steps with difficulty, than use wheelchairs. In some cases parts of a vehicle fleet may provide easy access for ambulant persons with disabilities as long as other parts of the fleet are also accessible by wheelchair users.
- The purchase cost for a new or used vehicle(s), or the availability of donated vehicles
- The requirements for wheelchair lifts or ramps, for securements and tracks, and for seat belts that are built into or fitted on the vehicle, keeping in mind the need for flexibility for different configurations including (1) wheelchair securement positions and (2) storage space for folded wheelchairs for passengers who can transfer to a regular seat
- The need for adequate handrails for disabled passengers, wide doors, minimal steps, color contrast on steps and key surfaces, and padding if needed on sharp or hard surfaces
- The use of well-designed comfortable seats, and the tradeoffs between cushioned seats and hard seats

- Ongoing fuel costs that vary with the projected liters of fuel/100 km of travel
- Engine type and availability of fuel and fueling facilities
- The need to meet high standards for pollutant emissions
- Availability of spare parts, trained mechanics, and maintenance technology and the anticipated maintenance costs for different types of vehicles and the ease of repair of each type, including the availability of local servicing of warranties
- Road and weather conditions that may require more- or less-rugged construction, road clearance, etc.
- The location and number of doors and windows, including emergency exits
- Air conditioning or heat for passenger comfort and ability to open windows for air
- The use of technical equipment, including fare collection devices, smart/electronic fareboxes, GPS/mobile data terminals or tablets, cell phones or radio communication with a call center, and security cameras
- Secure storage or garaging space for the vehicles

Helpful hints when obtaining vehicles:

(1) Larger systems may wish to consider staggering the purchase of vehicles so that there is approximately the same number of vehicles purchased every year.

(2) Current operators can use peak period ridership and vehicle needs to calculate the number and range of vehicle sizes to accommodate varying demand.

(3) The projected increase in service over the next several years, plus projected disposals of vehicles, will help forecast the number of new vehicles needed.

(4) The number of spare vehicles (sometimes called the "maintenance float") can be based on the experience of similar systems and other advice from knowledgeable persons.

When should a vehicle be disposed?

*Not* when it has been "run into the ground" and is worthless! On the one hand, if you replace the vehicle too soon there are more capital costs than warranted. On the other hand, if you replace the vehicle too late there are more maintenance and operating costs than warranted. So try to estimate the optimal vehicle life that results in the lowest minimum capital cost (purchase less disposal value) + maintenance cost + operating cost. We note this concern also in Section 10 (NGO transportation). Keep in mind that in some cases it may be cost-effective to rehabilitate and refurbish a vehicle in order to safely extend its life.

Purchasing cheap used vehicles may not be a good solution.

The life of such vehicles may be very short, and if they are brought in from another country there may be very little recourse with the seller if the vehicle is not as promised and has unanticipated problems resulting in high maintenance costs.

**5.2 Lifts, ramps, wheelchair tie-downs, and passenger securements**

Vehicles used for the transport of wheelchairs and their users will be either a small vehicle, such as a metered taxi, where there is a space dedicated for the accommodation of one person seated in a wheelchair, or a mini-bus, van, or larger vehicle capable of carrying multiple persons using wheelchairs.

Seating: Mini-buses and other vehicles may have the capability to change their internal layout by removing seats to make space for wheelchairs and occupants.

Bonded floor systems, Illustrated in the photo at left, can provide a simple means to achieve a flat floor with parallel tracking to aid seat fitting. This 'flexible layout' approach can allow vehicle operators to maximize the use of their vehicles as they respond to different transport requirements as demand requires. In this way, maximum return on vehicle investment can be achieved.

Removable seat fittings and tracked floor systems, shown below, can be used to quickly remove seats as required.

Wheelchairs

The types of wheelchairs used by many people with disabilities will vary according to their individual needs, the extent of disability, or the requirement for sometimes complex seating support surfaces.

A primary design requirement for a *manual folding-type wheelchair* is to be able to reduce its size and lift it into the back of a car or storage area. Manual folding wheelchairs will generally weigh approximately 20 kg, or thereabouts. Manual folding wheelchairs may be user-propelled with large rear wheels so that they may be pushed by the user, or they may have small rear wheels if intended to be propelled by an attendant or care-giver.

Early types of *powered wheelchairs* were less complex manual-type wheelchairs fitted with a power-pack, electric motors, and a control unit. In many locales, powered wheelchair design is now well developed. Designs may include rear- or front-wheel drive and some outdoor wheelchairs may have four-wheel drive. It is increasing common to see wheelchairs with six wheels, the centre pair providing drive. This type of wheelchair is highly maneuverable.

Whatever the type of wheelchair, its manufacturer is responsible for stating if it is suitable for use as a seat in a motor vehicle. Manufacturers of wheelchairs that are suitable for use as seats in vehicles will design and test their products according to one of more written International or National Standards such as ISO 7176 Part 19 or ANSI/RESNA WC19. Statements of a wheelchair's compliance to these standards will be made in the wheelchair manufacturers' User Manual or Instructions for Use, with details about how to secure the wheelchair when in transport.

More information on types of wheelchairs is available by typing "types of wheelchairs" in a search engine. Also see ORN 21 in the Resources section.

Wheelchair lifts and ramps

Wheelchair and occupant access into the vehicle may be made using either a ramp or a passenger lift platform. Readers may go to a search engine for information on ramps and lifts. Care should be taken that ramps and lifts follow all applicable safety standards. In the USA, for example, there are regulations governing many aspects of ramp or lift design. Included among these, for most situations, is a requirement that the design load be at least 600 pounds (272 kg), that the ramp or lift have a width of at least 30 inches (760 mm), and that the ramp or lift have a non-skid surface. Many other standards apply. Some comments on driver training for safe use of lifts and ramps are found in Section 6.


Photo courtesy of Handicaps Welfare Assn. of Singapore

Ramps may fold for ease of use and storage within the vehicle. Ramps are often fitted to smaller taxi-type vehicles. Larger paratransit vehicles frequently use passenger lifts, mainly due to the height of the vehicle floor above ground level. Where possible, training should be sought from lift vendors in the use of passenger lifts, and in the various precautions to ensure passenger safety and manual operation in case of power failure.

Wheelchair securement area: Typically, the floor space required for a forward facing wheel-chair, occupant and tie-down system will be 1300 mm long x 750 mm wide. On occasion, a larger space may be required, depending on the type of wheelchair and it's setup.

Wheelchair securement (tie-downs) and occupant restraint systems

The term 'Wheelchair Tie-downs and Occupant Restraint Systems' is used to describe the equipment needed to (1) *secure* a wheelchair with tie-downs, and (2) *restrain* a seated wheelchair user when travelling in a road passenger vehicle. The terms used -- 'secure a wheelchair' and 'restrain an occupant' -- are carefully chosen. (1) The wheelchair needs to be held to the vehicle floor to provide a stable seat platform similar to that of a vehicle seat and (2) the passenger seated in his/her wheelchair must be restrained in a way that allows

controlled occupant movement to 'ride-down' the forces created by a crash event. In this way, the risk of occupant injury through being ejected from their seat and making harsh contact with the interior of the vehicle is reduced to acceptable levels. Note that wheelchair securement systems and passenger restraint systems need to be *separate* from each other to prevent the weight of the wheelchair from bearing on the rider in the event of an accident.

It is of fundamental importance that drivers and passenger assistants should carefully read and follow the manufacturer's instructions for the use of wheelchair tie-down and occupant restraint systems. Most manufacturers have training materials such as diagrams and videos to assist in correct usage. Good examples can be viewed on www.unwin-safety.com.

(1) Wheelchair securements (tie-downs)

By far the most common means of *wheelchair securement* for transport is the 4-point tie-down system. The 4-point system can, by virtue of it's design, be used with a wide range of wheelchair types and models to achieve a stable seat surface in general vehicle motion as well as in a crash situation. The wheelchair manufacturer has the responsibility to mark tie-down attachment points.

There are a number of different generic types of wheelchair securement mechanisms given in International and National Standards, such as ISO 10542, SAE J2249 and ANSI/RESNA WC18.

(2) Occupant restraint

Generally, wheelchair *occupant restraint systems (seat belts)* are of the 3-point type, made up of a lap or pelvic portion and a shoulder belt. The term 3-point refers to the number of anchorages for the seat belt system, being one for each side of the lap belt, on left and right sides of the wheelchair, plus the upper anchorage on the side wall of the vehicle for the shoulder belt.

See Section 6 on driver training for more information and photos to illustrate wheelchair securement and occupant restraint.

### 5.3 Maintenance

There are three types of maintenance: (1) daily fueling and cleaning of vehicles and cycling of wheelchair lifts (servicing); (2) maintenance scheduled at planned intervals (preventive maintenance and also warranty work), and (3) random as-needed maintenance (as with accidents and road-calls when a vehicle breaks down). When planned maintenance does not occur, your system will pay more in the long run as safety and service reliability suffer along with a public perception that your service is deteriorating. In general, attending to maintenance should be done quickly, consistent with a need to keep enough vehicles in operating condition to meet the daily demand for service.

Whether you are a one-vehicle system or a large municipal system, you need to have a formal written maintenance plan in place, with maintenance records kept for each vehicle over the entire period you own the vehicle. By analyzing this data, you can control your maintenance system and, for example, see if road conditions on some routes are excessively hard on vehicles and rotate vehicles among routes accordingly.

Larger systems need to have clear lines of authority to show who is in charge when there is a disagreement between operations personnel (who want to keep enough service available) and maintenance personnel (who want more time to perform needed maintenance).[7]

Especially for smaller systems, it is often wise to contract out maintenance, but records need to be kept and the maintenance needs to be monitored as if it were occurring in-house.

Your *drivers* have a role in maintenance, by use of a formal set of pre-trip and post-trip inspection procedures and a process that ensures that the results of these inspections are dealt with by maintenance personnel, whether contracted out or in-house within your own system. If a vehicle is not in proper condition, it needs to be sent for maintenance and another vehicle provided. Pre-trip and post-trip inspections should verify the adequate condition of all lights and signals, windshield wipers and washers, parking brakes and wheel brakes, doors that close properly, tires and wheel lugs, steering/transmission/engine, interlocks with doors and lifts, emergency exits and alarms, fire extinguishers, and first aid and blood borne pathogen kits. They should also verify the good condition of accessibility features including all lifts and securements and tie-downs, the good working order of communication devices and of heating and air conditioning, and both interior and exterior cleanliness and damage.

Your *passengers* also have a role in maintenance: they need a formal process through which they can provide complaints and observations about vehicles in order to alert maintenance personnel.

For further information about *preventative maintenance*, go to www.globalride-sf.org/paratransit/vehicles.html and additional sources provided. Paratransit practitioners should go into greater detail by, for example, going to "preventative maintenance checklists" (or preventative maintenance "schedules" or "software") on a search engine such as Google. Also keep in mind that maintenance schedules need to be at shorter intervals if this is indicated by weather or road conditions or vehicle quality. Preventative maintenance is based on the well-proven premise that regularly scheduled maintenance (based on vehicle kilometers or vehicle hours in service) will cost less and provide safer and more reliable vehicles than a maintenance plan that is designed for maintenance to occur only when something breaks or looks like it is going to break. Warranty work, where applicable, should be done in a timely fashion in order to reduce maintenance costs and to have quality work done.

When vehicle *breakdowns* do occur, and an in-house or contracted mechanic is unable to quickly resolve the problem, the paratransit system needs to have in place arrangements for towing disabled vehicles.

Adequate *spare parts* should be kept on hand by whoever maintains your vehicles. It is always best to use parts and supplies from the original equipment manufacturer. Caution is needed to avoid counterfeit spare parts. If rebuilt parts are used, care should be taken that

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7 When offered free or reduced-cost maintenance by a government agency, first check that someone else's vehicles will not have priority over the maintenance of your own vehicles. The editor of this guide found himself offering such "free maintenance" to a pioneering paratransit provider in San Francisco some decades ago, only to find that delays in maintenance were causing a backlog of out-of-service paratransit vehicles waiting for maintenance while other municipal vehicles were being serviced. If other agencies offer to help with maintenance, it is a good idea to get the agreement in writing with a clear understanding of different responsibilities.

they are of good quality. Sometimes parts are cannibalized from older vehicles, which may be appropriate in some situations where the vehicles have no remaining value, there is a small spare ratio, it is difficult to meet daily demand for service, or when parts are simply not available in a timely manner. Spare parts should be securely stored, and maintenance work orders should be cross-checked against actual parts used in order to prevent theft and to assure that parts remain available "in fact" and not simply "on paper."

Maintenance of tie-downs and restraints

When not in use, and directly after use, all components of the wheelchair tie-downs and occupant restraint systems should be removed from the vehicle floor, paired together and stored in a suitable container or on the side wall within the vehicle. Removal and storage will prevent the equipment being damaged or soiled by being walked on or rolled over by a wheelchair. Correct storage will also prevent the equipment from becoming a missile in the event of a crash event.

Wheelchair tie-downs and occupant restraints play a fundamental role to provide safe transport for passengers seated in wheelchairs. The responsibility for regular inspection and maintenance of all items of equipment lays with the transport provider. All staff engaged with the equipment usage should carefully observe and follow the maintenance instructions of equipment manufacturers.

### 5.4 Fuel

Fuel can be one of the largest costs of any paratransit system. Here are four ways to reduce the cost of fuel.

(1) Think carefully about what type of engine (and associated fuel) will be used before you procure a vehicle. This is noted in the case study of Persatuan Mobiliti in Kuala Lumpur. Gasoline and diesel fuel are the usual options, but compressed natural gas (CNG) is growing in popularity, including for use in auto-rickshaws and other small vehicles. Electrical propulsion is also a growing option in some areas and should be considered where available. The need to reduce carbon footprints and reduce pollutants that cause global warming is an important factor in creating sustainable cities and towns. Fortunately, most of the factors that reduce the provider cost per paratransit trip *also* reduce the use of fuel per passenger trip.

(2) Another important action in fuel cost control is determining a plan for fuel purchase and storage. While it may be cost-effective to fill up the tank every day at a nearby local vendor, it may be more cost-effective to invest in an on-site fuel storage unit. Then (1) fuel can be purchased less expensively in bulk, and (2) you can minimize deadhead time to fuel your vehicles because fueling is on-site. But examine tradeoffs including safety issues. Perhaps you can buy fuel more cheaply by working with other transit providers, or with an association of small systems, to permit bulk purchases of fuel.

(3) A third important action is to train drivers on fuel-efficient methods of driving. Drivers can significantly reduce fuel consumption by not aggressively accelerating, decelerating, speeding, revving the engine, or idling. You can spot some safe driving problems by keeping track of fuel use for each driver.

(4) The fourth action is to monitor and control access to fuel whether on-site or at gas stations. This is usually done by keeping track of fuel usage by vehicles and by drivers.

### 5.5 Facilities

A very small paratransit system, especially one that uses three-wheeled vehicles, may conduct much of its maintenance in informal situations. Care should be taken, of course, for the proper disposal of fluids, and to reduce the noise from repairs and the testing of engines. Care should be taken for the safety of pedestrians walking by and of children in the neighborhood.

Maintenance for most paratransit systems is usually provided at a gas station or garage, or at an in-house facility.

An ideal "home base" for many larger paratransit systems would have the capability of vehicle fueling, vehicle washing and cleaning, pre-trip and post-trip vehicle inspections, and work bays for vehicle maintenance to be used exclusively by maintenance personnel. (Work bays would provide areas for work, spare parts storage, tire storage, and maintenance supervision, all depending on the size of the paratransit system.) In any facility, attention should be given to good lighting and ventilation, noise control, safe equipment, reduction of fire hazards, and general cleanliness. Written procedures for all this should be kept on hand. Even a small system can insist on professionalism, good organization, and clean conditions – this will improve the morale of everyone, including your vehicle drivers. Indeed, some small systems can differentiate themselves from other systems precisely by offering a quality of professional service that will command a more loyal clientele.

When it comes to procuring vehicles and parts, maintaining vehicles and equipment, or fueling vehicles, the one piece of advice that almost always applies is to have written procedures and keep written records. The complexity of these procedures and records will depend on the size of the system. Even the owner-driver of a single small vehicle will want to keep procurement, operating and maintenance records in order to document concerns, monitor fuel consumption, and consider when maintenance is needed.

**This section was prepared by Richard Schultze, with the exception of Section 5.2, which was prepared by Unwin Safety Systems of the United Kingdom.** – Photos courtesy of Unwin Safety Systems

Go to www.globalride-sf.org/paratransit/supplement/vehicles.html for Richard Schultze's more detailed discussion of vehicles, facilities, and equipment.

# Case study: MOSCOW'S MUNICIPAL "SOCIAL TAXI"

## Introduction


Moscow has approximately twelve million residents, with another seven million living in the surrounding area (the Moscow Oblast). The city is beginning to provide access features through the increasing provision of low-floor buses and trams on surface routes operated by Mosgortrans (Moscow municipal transit), as well as access to some of the stations of Moscow's famous underground Metro. However, these huge systems are only starting on the long path to becoming fully accessible to all beneficiaries of accessible transport. Fortunately, Russia manufactures several models of low-floor buses, mini-buses, and trams which can be phased in as time goes by.

## History

Moscow paratransit services have roots going back into the early 1990's, including pilot services initially offered by Moscow Charity House in coordination with several social service agencies. In 1994, the Moscow branch of the All Russian Society of the Disabled (ARSD) initiated services on a small scale and went on to found "Vozrozhdenie" in 1996-97. This agency distributed adapted automobiles to disabled residents free of charge, also initiating a paratransit service with several dozen adapted vehicles provided by the City of Moscow's Department of Social Defense. The "Social Taxi" service was initiated in 1998 and reorganized in its current form in 2009. This paratransit service is currently under the auspices of Mosgortrans, whose Second Bus Fleet won a tender for the city subsidies and was designated as the social taxi operator in 2009. The Second Bus Fleet had a prior history of assisting with garaging and maintaining Moscow's paratransit vehicles. Mosgortrans includes private sector subcontractors in performance of some of its paratransit services. Through all these changes, for some twenty years, the Moscow City Organization of the ARSD has conducted the eligibility screening of passengers.

## Service Data

Ridership

More than 450,000 annual trips are currently provided, up from 425,000 trips in 2010. Around 30% of the services are for passengers with recurrent trips to work or school.

Eligibility criteria and registration process

The Social Taxi system is limited to officially registered Moscow residents. Passengers with a broad range of disabilities are accepted, with priority given to passengers with motor disabilities, disabled children, disabled veterans of World War Two, and some low-income

families with at least three children which live at a distance from vital services. Clients are certified by the Moscow City Organization of the All Russian Society of the Disabled (ARSD) under their contract with the city Department of Social Defense. Potential users bring necessary documents to the office of the ARSD, or if necessary the documents can be brought by an empowered person or a social worker. Eligible clients receive special tickets for different trip durations (15, 30, 45, and 60 minutes). The ARSD also receives and reviews applications for group trips submitted by disability organizations prior to sending them on to the Department of Social Defense for final approval.

Following pilot testing in 2010 with 25 vehicles, Moscow has been phasing in the use of personal plastic "Muscovite Social Cards" for use in fare payment. This card will eliminate the need for the ARSD to issue trip tickets and to conduct eligibility screening, because such screening will be included prior to issuance of the multi-purpose "Muscovite Social Card."

Fares

The costs of the trips are divided equally between user-paid fares and a municipal subsidy of the other half of the cost. The average user fare is approx. $US7 to 10. The payment is 210 rubles an hour for a taxi (US$6.45) and 300 rubles an hour for a minivan (US$9.20), which as noted is approximately 50% of the regular commercial price, with the city government covering the other 50%. Passengers may be accompanied by one person.

Service Parameters

Service is provided within Moscow and its surrounding metropolitan area (Moscow Oblast) seven days a week, from 6am to 8pm, and also provided at night to bus and rail stations in Moscow and to airports within the Moscow Oblast. Trips within the surrounding Oblast are limited to airports, rehabilitation centers, cemeteries, and country residences (dachas). At least 12-hour advance registration is required, at a call center that handles approx. 1,500-2,000 calls daily and books about 1,000 trips daily. In emergency cases, the taxi can be ordered four hours in advance if cars are available. Any cancellations must be made two hours prior to scheduled taxi pickup times. Evidently there is a large waiting list at times and it appears that many callers are wait-listed to see if service becomes available. Disability organizations can also schedule group trips one month prior to an event.

Dispatching is computer assisted, using a Russian "Infinity Taxi" program. The program organizes incoming calls, records all calls, and determines client telephone numbers. The program also develops needed reporting on all calls including lost calls, availability of phone lines, etc. The system keeps track of all orders and automatically distributes orders among drivers and assists drivers to choose the best route.

Funding Sources

The service is funded by public funds by the City of Moscow, which cover about half the cost of individual trips and the full cost of group trips scheduled by disability agencies. The City of Moscow also funds the purchase of vehicles, which are currently provided to Mosgortrans by the Department of Transport.

Organizational Structure/Staffing

The service is operated by the city of Moscow through the Department of Social Defense.

The Social Taxi service employs 250 people including drivers, dispatchers, logistical personnel, and auto mechanics. Drivers are carefully selected and trained to work with people with disabilities. Since 1995, the Moscow Dept. of Social Defense, the Moscow branch of the ARSD, and Mosgortrans have coordinated the social taxi service. The ARSD currently has two cashiers who sell tickets for the taxi trips to qualified passengers.

Fleet and maintenance

The Social Taxi service comprises a mixed fleet of more than 300 sedans, minivans, and larger buses to serve persons with disabilities, sized to meet different needs. Some 150-200 Ford and Fiat sedans currently provide social taxi service. In addition, approx. 70-80 lift-equipped Ford and Volkswagen mini-vans are incorporated into the service, each with two wheelchair securement positions. The sedans are equipped with rotating seats to assist boarding by disabled passengers, similar to the seats used in London taxis. The minivans are equipped with lifts. Group trips are provided by large lift-equipped Russian-built PAZ, LiAZ, and Volzhanin buses.

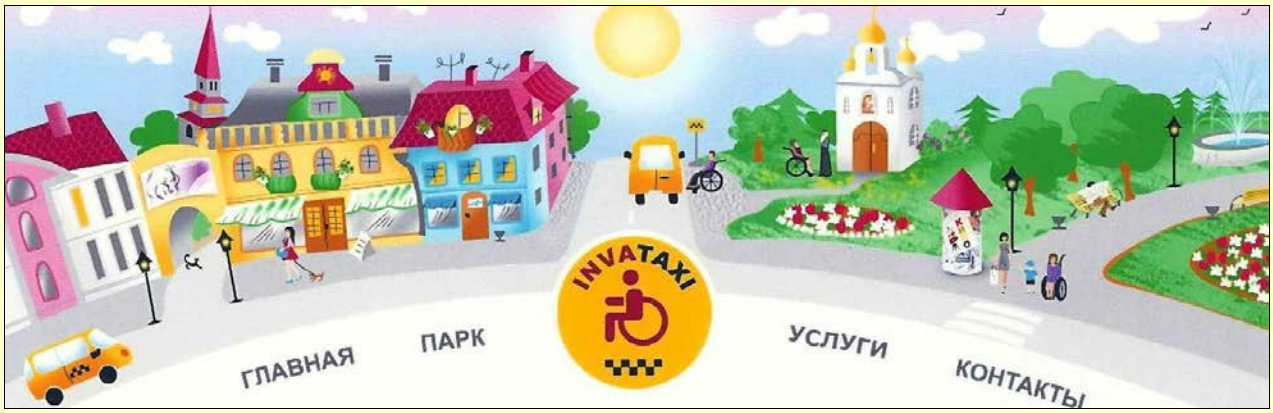
Some current issues

- Moscow has massive problems with traffic congestion, causing delays in the Social Taxi service.
- The Social Taxi program appears to be over-subscribed and unable to handle total demand. To partially address this situation, there are plans to limit eligible persons to those unable to use public bus, tram, or Metro services.
- Older persons prefer the use of the traditional physical tickets and there is some resistance to the phasing in of the "Muscovite Social Card."

**This case study was prepared by Elena Goubenko in Moscow on behalf of AEI, based on her meeting with Nadezhda V. Lobanova, the President of the Moscow City Organization of the All Russian Society of the Disabled, in late 2011. The study is supplemented by Ms. Goubenko's translations from various websites. We are also indebted to earlier information provided by Dr. Vadim Donchenko, and by Valeria Sviatkina and Tom Rickert.**
The photo at top is from Moscow Social Taxi.

Smaller startups may be able to supplement large municipal systems in important ways, but may face a different set of financial concerns. Such a startup is presented in a second case study from Moscow, found below.

## Case study: A SMALL MOSCOW STARTUP




Roman Kolpakov recently organized "Invataxi" as a two-vehicle non-profit charity to meet some of the needs of wheelchair users and other disabled Muscovites or visitors who are unable to use the fully booked municipal "Social Taxi" system. There are also one or two commercial firms that specialize in transport for disabled persons but for various reasons are not preferred by passengers who wish to use Invataxi. Invataxi operates a new Ford Transit minibus, donated by an automotive company, which can transport three wheelchair users and nine seated passengers. It also operates an old Nissan minivan equipped for one wheelchair user and two seated passengers -- the aging minivan incurs heavy maintenance costs and needs to be replaced.

Kolpakov employs two drivers, who are provided with special training and can help people while boarding. His wife works as a dispatcher and accountant out of their home. The Invataxi fare is 600 rubles/hour (approx. US$20/hr), about twice the fare of the Social Taxi, but still does not cover all expenses. The minimum duration of a trip is three hours. In a huge city such as Moscow, this long trip duration would often be required for cross-town travel to hospitals, excursions, and transfer to or from airports.

Like some other paratransit startups, Kolpakov definitely did not go into this work "for the money." He uses a wheelchair following an accident he suffered around ten years ago. He then realized he had to plan his activities too far in advance in order to access the Social Taxi system. His goal is to help others by providing a superior service for those who may "fall through the cracks" in the municipal system. But even with donated vehicles, and while charging twice the hourly rate of Moscow's subsidized Social Taxi, he notes that maintenance, garaging, insurance, driver salaries and other costs must be assisted by donors.

**This case study is based on correspondence during 2012 between Mr. Kolpakov and Tom Rickert of AEI, with additional input by Elena Goubenko in Moscow.**

# Section 6: STAFFING AND TRAINING

Go to www.globalride-sf.org/paratransit/supplement/staffing.html for an expanded treatment of personnel matters by Richard Schultze.

***Purpose of this section:*** *(1) To briefly describe issues of recruitment and retention of paratransit staff, with (2) a more detailed introduction to specialized training for transporting seniors and persons with disabilities.*

Paratransit organizations are only as good as their employees and how those employees are put to work. Every transport agency needs to understand its goals and the jobs that must be performed to achieve these goals. Large or small, every agency has similar functions that need to be carried out. These functions include "operational" tasks which have to do with the daily managing of a paratransit service, including the scheduling, dispatching, and maintenance of vehicles. They also include "administrative" tasks that support the operations. Generally, the administrative tasks are related to financial management, procurement of vehicles and equipment, personnel management, planning, public relations and all the other matters that support the larger operation even though they are not as visible to the general public.

An organizational chart, also known as a "table of organization," is a simple diagram showing who reports to whom and what duties they have. A one person shop is easy to draw. A larger organization will have many position boxes to fill. Each position requires different skills. For example, while everyone in the organization requires reasonable people skills, drivers in contact with riders and the general public especially need to be knowledgeable, pleasant and courteous to those with whom they have contact. Many positions require technical skills, such as vehicle maintenance, scheduling, personnel administration, finances and accounting. And of course everyone in the organization must be honest and ethical, lest they harm the organization.

An organization needs to diligently focus on (1) recruiting and retaining good employees who are motivated to serve their passengers, and (2) training employees to competence in their work, with specialized training and periodic retraining to assure that they meet the requirements for transporting seniors and persons with disabilities.

### 6.1 Recruiting and retaining good employees

Paratransit employees may work for a private sector company that may or may not be under contract with a government agency, or they may work as government employees or as staff of an NGO or other "civil society" agency. In all events, managers will need to determine how many employees are required for different positions. A good start would be to determine the employee requirements of similar agencies elsewhere. A single owner-operator has a simple situation. But, as the service is scaled up and more vehicles are added, there may be a need for dispatchers, supervisors, maintenance and other office workers, as well as more drivers. Complicating this picture is the fact that employees will always come and go, it is hard to find and keep good employees, and often no employee will be completely perfect for a given position. In the midst of this, managers must match the skills needed with the skills offered by potential employees, while offering a salary and working conditions sufficient to foster the retention of employees.

Also, the educational level and prior technical or vocational training of potential employees will vary from region to region, as well as the health and wellness of the general population. Other factors include the tradeoffs which arise when employees are hired from within one's family or associates and any prevailing discrimination against segments of society which, in turn, can sharply limit the labor pool for recruiting employees.

It is important that the organization prepare a formal job description that clearly outlines the duties, working conditions and pay of the desired position. Such a job description provides clarity for the job seeker as well as for those making the selection. It is also important for a formal job application to be filled out with specific information about the applicant. If a position does not require an applicant to be literate in the language used by the agency, then the organization must clearly describe the position to the potential applicant and fill out the job application on behalf of the applicant.

Recruitment starts with letting potential job applicants know that a position exists. This can be through word of mouth with current and former good employees, family, friends, neighborhood and community leaders, places of worship, local social clubs, and professional associations. It can also rely on advertising in local newspapers, notices on an organization's web site and other social media, notices on the vehicles, working with employment agencies, and other methods.

Applications may be divided into three groups: those who meet or exceed the requirements, those who *may* meet the requirements, and those who clearly do *not* meet the requirements. Interviews with applicants from the first two groups, and reference checks, should then screen out inaccuracies if an applicant has exaggerated his/her qualifications or made false statements. Where possible, it is always a good idea to have a second level of review of applications to make sure the review is as unbiased as possible.

Once a reasonable number of applications are on hand, managers should conduct background checks to avoid hiring persons with current alcoholism or drug abuse problems or with a criminal history, including a history of violence or of sexual abuse crimes. *This is especially important for paratransit systems serving passengers whose physical, sensory, or cognitive disabilities make them more vulnerable to predatory personnel.*

Once inappropriate applicants are put aside, the organization should then limit its consideration to applicants who (1) are of legal age to be adults, (2) are in good health as confirmed by a physical check-up prior to employment, (3) have appropriate reading skills if required by the job, and, if the person is to operate a vehicle, (4) possess a proper drivers license, and (5) have a clean driving record. A clean driving record may vary from one place to another. For example, such a record in any safety-sensitive job could indicate no more than two violations in a three-year period, no convictions for driving under the influence of alcohol or drugs, two full years of driving with no moving violations if a license had been suspended in the past, and no convictions for a felony or drug or alcohol related offense. The applicant must also have the ability to handle stress, sensitivity to people with special needs (see below), and successfully pass any required pre-employment drug/alcohol testing. Remember, your organization will suffer if it allows the employment of people with current drug or alcohol problems.

Once recruited, decent wages and an adequate working environment are needed to retain employees so that they do not leave for better opportunities elsewhere. At a minimum,

wages and working conditions should fully comply with all laws and regulations. Some areas to be considered by managers include:

(1) Wages and benefits need to be attractive enough to recruit and retain good employees while still allowing the paratransit organization to be financially sustainable. Wages and benefits need to be competitive with other transit or non-transit jobs and should reflect the value of the position to the organization with gradations for different skill levels, responsibilities, and length of employment. Comparable jobs need to have comparable pay. Employee morale will suffer if there is an appearance of favoritism or discrimination. Benefits packages, including health care benefits, need to be carefully considered and, at the least, compliant with all applicable laws and regulations. Keep in mind that benefits improve the health, longevity, loyalty, attendance and productivity of the employees. This is especially true of health insurance.

Some benefits do not have a cost, but can be popular with employees. For example, schedule flexibility can permit employees to care for sick children, spouses or parents. Or employees may be able to have second jobs that do not unduly interfere with transit operations nor excessively tire out the employees.

(2) Working conditions should show respect for employees. The working environment should be free of physical and sexual harassment, bullying, and discrimination. Supervisors should be trained to provide appropriate management styles. Driver schedules should include proper breaks for rest and meals. Off-duty drivers will need clean bathrooms and adequate rest facilities, while all facilities should be safe and sanitary. Hours and working conditions should not compromise the safety and well-being of drivers nor the safety of passengers, transit vehicles and equipment. Attention should be given to the dangers of driving long periods in highly polluted air. To the extent practical, the workplace and policies and procedures should be able to accommodate people with disabilities both as customers and as employees.

(3) Drivers and other employees need to be encouraged to provide suggestions and ideas. There needs to be a process in place to enable employees to make suggestions about the transit service and operations, vehicles, working conditions, treatment by supervisors, etc., without the fear of retribution.

(4) Personnel policies should be clear, reasonable, and in writing. Good supervision of employees should avoid subjectivity. Employee policies should be written and, where appropriate, posted "on the wall." These policies should spell out procedures for periodic evaluation of employees, employee discipline procedures (e.g., warning for a first offence, time off for a second offense, termination for a third offense), and incentives. When a supervisor points to a written policy, his/her interaction with a driver or other employee is likely to be better than if the policy is vague and subject to different interpretations. Evaluations need to be shared with employees and an action plan to address any problems should be developed, followed, and monitored. A reminder: Employees should quickly be advised of problems and provided resources, discipline, or retraining to remedy problems – the periodic evaluation should normally *not* be the time to bring up any problems for the first time. Employees need to know that the personnel policies will be used to retain good employees, to provide a documented basis for advancement in the organization, and to dismiss employees who violate the policies.

Your agency should have written policies and procedures that specify driver work rules. At a minimum, these rules will reflect any labor regulations that are in place. They should reflect practical and fair practices in the specific local situation and should specify maximum work hours between breaks, per day, and per week; availability of straight shifts and split shifts to address times of peak work loads; issues of part time vs full time work; maximum break time for which there is no pay; and "extra board" (drivers waiting on call for work if needed) pay and availability to work.

(5) Drivers should be monitored "on the street" as necessary. It is important that drivers not be reckless, deviate off route for arbitrary reasons, skim fares, disrespect their disabled passengers, damage their vehicles, steal fuel, etc. Drivers can be monitored by passenger commendations and complaints, on-board cameras, GPS tracking, "ghost riders" that ride a vehicle and observe driver behavior, and supervisors who follow vehicles or who ride vehicles with the full knowledge of the driver. The case study from Cape Town notes some of these practices. Employee records should include periodic criminal background checks, maintenance of good driving records, assurance that driver licenses are kept current, ongoing monitoring of the health of safety-sensitive personnel and their ability to handle their tasks, and ongoing drug and alcohol testing programs where these are appropriate. These records may be needed for good management of human resources or required by government regulations, funding sources, and for potential future litigation.

(6) A code of conduct and business ethics should ideally undergird a paratransit agency's work and provide a benchmark against which to measure the actual success of management and employees at all levels in reaching their goal of providing safe, accessible, reliable, and affordable transport for seniors and citizens with disabilities. Such a code would prohibit financial or other conflicts of interest. Go to "conflict of interest policy examples" on a search engine such as Google.

### 6.2 Training

General comments on training

Training is not a "one time only" matter. It is easy to forget knowledge and skills if they are not used. Thus *periodic re-training* is important for paratransit drivers and others. *Cross-training* may also be needed, for example to assure that both drivers *and* attendants (if they are used as part of your service) can safely secure wheelchairs and their occupants.

Training is needed for different roles, including managerial, vehicle maintenance, scheduling, planning, accounting and finance, information technology, transit vehicle driving, and other roles. Training can occur at elementary and high school levels, or through other education or experience gained prior to entering a job.

Training is often provided in-house by the paratransit agency, using the organization's training staff or using regular employees that are given the duty and opportunity to mentor, advise, and train new employees. Note the use of veteran drivers to train new drivers by Atende, in one of the case studies from São Paulo.

Training can also be provided from outside the organization. Employees can be sent to a training facility or school, to conferences, or to programs set up by vehicle manufacturers, consultants, transit associations, or local universities. Training can also be provided by on-line services such as Skype, by webinar or teleconferencing training sessions, or by

purchasing training modules on electronic or print media. Sometimes employees pay for such outside training and other times the paratransit agency pays.

Managers new to paratransit may not know what training is needed or what gaps are present. They may need to bring in a peer or consultant from outside the agency to provide an unbiased evaluation of what training is needed for the organization's employees.

Specific comments on disability awareness training

Drivers of any vehicle that publicly transports passengers must be fully trained in safe driving. Multiple resources are available by going to key words such as "safe driver training" with a search engine, including such sources as www.smith-system.com or http://fleet.idrivesafely.com, or go to "Midas training for minibus drivers" on a search engine. Proper training needs to be addressed in every country. For example, a recent study of auto-rickshaw drivers in Chennai, India, reported that 37% of drivers were only self-trained, 39% had been trained by friends or family members, and only 22% had received formal training at a driving school.[8]

Modules on disability awareness can be easily incorporated into driver training programs. The British publication, *Enhancing the mobility of disabled people: Guidelines for practitioners*, notes the following elements commonly found in training to assist persons with disabilities.[9]

- A discussion of *barriers* faced by persons with disabilities, covering attitude, environment, and organizational barriers
- *Information on disabilities*, including hidden disabilities
- Suggestions for *removing barriers* faced by persons with disabilities (including changing driver behavior to improve safety), and the skills needed for serving passengers with disabilities (for instance, taxi drivers may need to learn how to fold a manual wheelchair by following the directions of a wheelchair rider who needs to transfer to a regular seat)
- *Communication skills* for communicating with persons with disabilities, particularly those with a hearing impairment or with learning disabilities
- Enabling staff to deal with *unexpected occurrences* – to 'think on their feet' if a problem arises (e.g., what to do in case there is an accident or other emergency)

In situations where formal training is not available, *The Transit Access Training Toolkit*, compiled by the editor for the World Bank, is at http://go.worldbank.org/MQUMJCL1W1. This toolkit includes model pocket-size guides for use with bus and paratransit drivers, posters to remind drivers to provide safe and accessible service, public service announcements for transit staff and the broader community, and information on disability awareness events.

One feature of this *Training Toolkit* is a model handout to be used as a pocket-card as a reminder to paratransit drivers, with a different pocket card also available for drivers of buses on fixed routes. This pocket card is available on the next two pages -

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8 Civitas Consultancies Pvt. Ltd., *Study of the Autorickshaw Sector in Chennai*, December 2010, accessed 11 June 2012 at http://chennaicityconnect.com/wp-content/uploads/2011/03/Auto-Study-Chennai.pdf.

9 Go to http://globalride-sf.org/pdf/ORN21.PDF

**This is a short version of a model handout for taxi and other paratransit drivers and their passengers with disabilities**

A pocket-size handout could be printed on both sides of a small card, such as below, and distributed to drivers and to passengers with disabilities and seniors. You can modify the guidelines as required by your situation and the type of vehicle (taxi, van, mini-bus, auto-rickshaw, etc.). (Source: *Transit Action Training Toolkit*, World Bank, 2009)

## Driver Responsibilities

**(door-to-door service)**

- **Drive safely.**
- **Treat passengers with disabilities with courtesy and respect.**
- **If possible, have the taxi office contact the passenger if you will be more than __ minutes late.**
- **Contact the taxi office if passenger is more than __ minutes late.**
- **Help passengers to and from the door of the building and into the vehicle. Make sure passengers are safely seated and seat belt is used.**
- **If needed, assist the passenger with up to 2 packages weighing not more than __ kg. each.**
- **Fill out log sheets for each trip.**

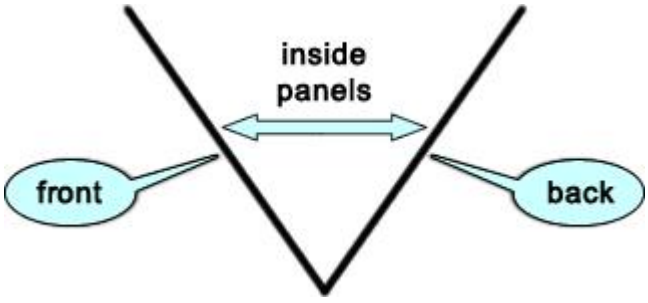
**FRONT**

## Tips for Seniors and Persons with Disabilities Using Taxis

- **Treat the driver and other passengers with respect.**
- **Book advance reservation trips at least __ hours before your trip during office hours.**
- **Contact the taxi office as soon as possible if you must cancel a trip.**
- **Be at the door or gate at the scheduled pickup time.**
- **Board on a wheelchair lift or ramp if needed and available. If you use a wheelchair, make sure it is secured by the driver.**
- **Request a seat belt if one is available.**

**BACK**

**A longer preferred model handout is on the next page.** You could print your handout on a folded card so that it has four pages. Make sure the guidelines apply to your situation.



**Tips for Passengers Using Door-to-Door Taxi Services**

- Treat the driver and other passengers with respect and dignity.
- Book advance reservation trips at least ___ hours in advance during office hours before trip. *(enter hours and taxi office contact information if needed)*
- Contact the taxi office as soon as possible if unable to take the trip.
- Be at the door/gate at the scheduled pickup time, unless otherwise specified.
- Board on a wheelchair lift or ramp if one is available (for those needing a lift).
- Make sure the driver helps with seat belts (& uses wheelchair securements).
- Have your exact fare ready for the driver.
- Tell the driver if help is needed and explain what assistance is needed.
- No smoking, eating or drinking in the taxi.

Back at top, inside left panel is below

**ADVICE FOR TAXI DRIVERS**

**Passengers with disabilities and seniors depend on <u>you</u> to get where they are going!**

- **Treat your passengers with respect and courtesy.**
- **Drive safely and smoothly.**
- **Consult with passengers, if needed, concerning their mobility needs.**
- **If possible, have the taxi office contact your passenger if you will arrive more than __ minutes late.**
- **Contact the taxi office if the passenger is not present within __ minutes of the scheduled time.** ***(modify as needed)***
- **Help passengers to and from the door of the building.**
- **Make sure the passenger is properly seated with the safety belt fastened.**

## How to Help Taxi Passengers with Disabilities

(and some tips about how passengers with disabilities and seniors can help taxi drivers do their job)

**Who is a person with a disability?**

- **Passengers with limited mobility, such as frail seniors and people using wheelchairs or crutches or canes**
- **Blind persons or those with impaired vision**
- **Deaf persons, or those who are hard-of-hearing**
- **People who may have a problem understanding signs and signals and directions**
- **People with hidden disabilities such as arthritis and heart disease**

Front at top, inside right panel is below

- **Be willing to assist the passenger by carrying up to 2 packages weighing no more than __ kg. each** ***(insert weight)***
- **Be willing to repeat information and use short sentences in a normal voice. Speak *directly* to passengers with disabilities, not to caretakers.**
- **Speak to deaf or hard-of-hearing passengers in a normal voice, looking directly at them as this may help them to read your lips. Have a piece of paper and pencil on hand if a passenger is unable to hear or to communicate in words with you.**
- **Make sure you know how to correctly operate any ramp or lift in your vehicle. Wheelchair securements *must* be used. If you need to stow a wheelchair, ask the wheelchair user how to do it.**
- **Fill out log sheets for each trip**

**Training to assist passengers using wheelchairs**

Section 5 discussed wheelchair lifts and ramps, and wheelchair tie-downs and occupant restraints (seat belts). What follows is an introduction to training for drivers, and attendants if available, in the use of this equipment. Satisfactory completion of training, in accordance with all applicable standards, must occur before a driver or attendant boards passengers using wheelchairs. Note that training should include the need to assure a clear travel path for wheelchair users when they are dropped off at their destinations.

Procedures for using wheelchair lifts

Lifts and ramps vary in design and agencies should follow manufacturers' instructions. The following procedure is an example from a typical agency when training drivers and attendants. It would need to be modified to accommodate differences in design or operation:

(1) Stop the vehicle on level ground with adequate space to deploy the lift so that the lift platform can open without hitting an obstacle and the passenger has adequate room to maneuver the wheelchair into position.

(2) Secure the emergency or parking brake, shift the transmission into "Park," and activate hazard lights.

(3) Open the lift doors from outside the vehicle and securely lock the doors in the open position.

(4) Ask the passenger if they need help getting onto the lift platform.

(5) After assuring that the passenger is using any personal safety belt while using the lift, carefully push the passenger onto the lift, usually facing outwards from the vehicle (Note: the position faced by the passenger could vary with the design of the vehicle.)

(6) Set the wheel brakes on the wheelchair, ask the passenger to fold their hands in their lap to reduce the possibility of hand injury, and affix the lift safety belt (called a "posey belt" in some countries) if equipped.

(7) Stand on the ground, with one hand on the wheelchair and one hand operating the controls, raise the lift a few centimeters to check that safety barriers are in place and locked, then continue raising the lift to the floor of the vehicle.

(8) When the lift is level with the vehicle floor, check that there are no gaps between the floor and the lift, advise the passenger that you are going to get into the vehicle in order to bring the passenger into the vehicle, step behind the wheelchair passenger while in the vehicle, release the wheelchair brakes, and pull them into the vehicle.

Note that wheelchair brakes often do not work properly, so do not trust them even while making sure they are on.

Procedures for using wheelchair ramps

Paratransit providers operating ramped taxis and similar vehicles should follow all applicable requirements for safe use of wheelchair ramps. The principles used with wheelchair lifts concerning stopping the vehicle on level ground with adequate maneuvering space for the wheelchair user and proper securement of any personal seat belts also apply to the use of wheelchair ramps. Keep in mind that the angle of the wheelchair ramp will generally be less

if the ramp is deployed to a raised sidewalk than to road level. A wheelchair rider is in danger of tipping over backward when using a steep ramp (e.g., with a 1:6 grade) without assistance.

When using a ramp, *the driver or assistant pushes the wheelchair with its occupant up the ramp*, usually front-first (facing in) when boarding, and, when exiting, guides the wheelchair backwards down the ramp (passenger facing in). The direction faced by the passenger could vary with the vehicle design. The driver or assistant always keeps his/her body between the wheelchair and the bottom of the ramp. When exiting, the driver or attendant's body should face the wheelchair but he/she should look backward in the direction of motion while keeping a firm grip on the wheelchair so that it will not roll down the slope of the ramp. (This guide does not have space to go into other matters, such as safe negotiation of a curb by wheelchair users. It is recommended that these topics be consulted in a search engine.)

Procedures for using wheelchair securements

The photos below show how the wheelchair securements are used to attach the front and the rear of the wheelchair to the floor of the vehicle.

The image below illustrates the "wheelchair securement-point" specified in the international standard, ISO 7176/19. Increasingly this symbol will hopefully be found on wheelchairs to indicate safe attachment points for their proper securement when transported in vehicles. If the wheelchair is of an older type or does not have tie-down points marked, four strong points on the wheelchair frame must be used as attachment points to secure the wheelchair. Points on the wheelchair frame that are lower than the seating surface are preferred. Tie-downs should never be attached to removable parts of the wheelchair such as arm supports, foot supports or to the wheels.

The rear tie-downs should be positioned directly behind the securement points on the wheelchair, so that the rear tie-down straps run close to parallel. Rear tie-downs should never be crossed.

It is desirable for front wheelchair tie-downs to make a straight run from wheelchair frame to anchor points on the vehicle floor. Floor anchorages that are wider apart than the wheelchair frame avoid interference with wheelchair foot supports and also increase lateral stability during vehicle movement.

Generally, front tie-downs are fitted first with the floor anchorages positioned level with each other, then rear tie-downs are fitted and tensioned to create a stable wheelchair.

When viewed from the side (photo at left), webbing straps running at an angle of 30° to 45° relative to horizontal are desirable to achieve maximum stability of the wheelchair.

Procedures for using occupant restraint systems

After the wheelchair has been properly secured, the correct fitting of an occupant restraint system is very important. An incorrectly fitted occupant restraint system will not only fail to restrain a passenger but in some circumstances may itself cause harm to the wearer.

Some wheelchair users will require posture support belts attached to their seat frame to help keep them in an upright seated posture on their wheelchair. Posture belts are often fitted on non-loadbearing parts of the human skeleton and must not be relied on to provide occupant protection in a vehicle accident. Whenever possible, posture belts should be left in place and the crashworthy occupant restraint system then fitted.

Generally, wheelchair occupant restraint systems, or seat belts, are of the 3-point type, made up of a lap or pelvic portion and a shoulder belt. The term 3-point refers to the number of anchorages for the seat belt system, being one for each side of the lap belt, on left and right sides of the wheelchair, plus the upper anchorage on the side wall of the vehicle for the shoulder belt. The photo illustrates a rear view of a 3-point seat belt affixed to protect the rider after a wheelchair has been secured.

It is important that the lap belt is fitted low on the pelvis of the wheelchair occupant and not lay on her/his stomach. Severe injuries can occur if the lap belt portion of the restraint system applies pressure on the abdomen, even in minor crash events. The proper position of the lap belt is illustrated in the photo at right.

The lap belt should be fitted low on the pelvis near the top of the passenger's thighs. When viewed from the side, as shown in the photo at left, the run of the lap belt should make an angle of 45° to 75° to the horizontal. This angle will minimise the risk of the lap belt riding up onto the stomach and causing injury by abdominal intrusion.

On wheelchairs that are designed for use in transport it is generally possible to fit the lap belt down between the arm supports and the seat back upright. On wheelchairs where this is not possible, the ends of the lap belt may need to be passed or threaded through gaps between the seat surface and the arm support.

The shoulder belt should then be attached to the lap belt, lay on the centre of the passenger's sternum and depart from the occupant running midway on the shoulder. As shown in the photo at left, the upper anchorage of the shoulder belt should be above and behind the passenger's shoulder and may need to be adjusted, or the position of the wheelchair be considered, in order to achieve ideal positioning.

In some circumstances, the medical condition of the wheelchair seated passenger can influence the fitting or routing of the occupant restraint system. Drivers and passenger assistants may need to be aware of and consider the individual requirements of each seated wheelchair passenger.

**Different approaches to driver training and motivation**

Outstanding paratransit drivers should be *commended for safe and courteous driving*. Too often, even when there is a telephone number for passenger comments, it is only to receive complaints, rather than to also receive commendations. Both passengers and transit managers should be encouraged to commend good drivers. For example, in some countries there is a "Driver of the Month" aware, with a certificate or prize for the best drivers. Recognition could take the form of a cash prize, an award certificate, a T-shirt or cap, a pin, a photo or article in a newsletter or a local newspaper, free tickets to a sports event or to a film, or perhaps a disability NGO could award the certificate at the headquarters of the agency providing the paratransit service.

Another approach is to plan a special *"Disability Awareness" session*. Persons with disabilities would be selected to be on hand, along with paratransit drivers and others. Such an event should be held in a positive spirit, with refreshments available. It would be a good opportunity to give awards to outstanding drivers, but also to exchange basic information about disabilities and tips on communicating with disabled passengers. It would also be an opportunity for "role playing" exercises, with paratransit drivers (and staff, including managers) playing the role of disabled passengers, perhaps using a wheelchair provided for

the occasion, or a blind-fold to help understand what it is like for a blind person to navigate within a paratransit vehicle. This type of event could also be coordinated with local operators of accessible fixed-route bus or rail systems, if desired. More information is found in Section 5 of the *Transit Access Training Toolkit*, noted above.

**This section was compiled by Richard Schultze and Tom Rickert. The discussion on training for use of wheelchair securements and occupant restraints was prepared by Unwin Safety Systems of the UK. –** Photos used in this section are courtesy of Unwin Safety Systems.

# Section 7: SCHEDULING, DISPATCHING, & OPERATIONS

This section is a summary of materials prepared by Richard Schultze. This section introduces a complex topic and we strongly recommend that agencies with multiple drivers and/or vehicles go to www.globalride-sf.org/paratransit/supplement/scheduling.html *and* to other materials for a fuller presentation of this topic. Larger municipal agencies should consult detailed literature on scheduling and dispatching software which may not be required by smaller systems.

***Purpose of this section:*** *To introduce practitioners to what is involved in receiving and scheduling trip requests, scheduling vehicle and driver assignments, and responding to emergencies.*

This section is an introduction to "the nuts and bolts" of the operations of the majority of paratransit providers that serve passengers with disabilities, who schedule most of their service a day or more in advance. This section applies less to paratransit systems where real time scheduling is provided through a call center, largely avoiding the complexities of advanced scheduling, especially if no subsidy is provided to disabled passengers or a smartphone app is used to automatically handle subsidized payments. And it applies still less to those systems where riders connect directly with drivers, for example using a smartphone application to get in direct touch with a taxi or other paratransit vehicle currently in their neighborhood.

### 7.1 Receiving trip requests

Trip requests may come from riders; from family members, friends, or caregivers; or from social service or other agencies acting on behalf of the rider. Depending on the situation, trip requests may come via phone, email, letter, or in-person visits. In most cities, trip requests come by phone to a call center. Even in very small systems, the scheduler should have a phone with an answering machine to take messages when it is not attended, and this phone should be checked at the beginning of the day and several times during the day. Of course large municipal systems may have multiple schedulers with a sophisticated computer-assisted operation, as is the case with the Moscow Social Taxi.

**Key information** must be provided by the rider, or verified when the information is already on hand for repetitive (subscription) trips for the same rider. This information includes:

Who: Name, address, and (when available) phone number and email of the rider. Also the age and sex of the rider if this is relevant.

Where & when: The desired date and time of the requested trip and any additional legs to that trip (for example, for multiple medical appointments on the same day), with the location and time of each pickup and drop-off point. If service is confined to zones within a city, both the pickup and drop-off points must be within the same zone.

Why: The purpose of the trip, if relevant, as, for example, when trips are prioritized by their purpose or when only certain categories of trips are permitted by a subsidized system (e.g., just for health or rehabilitation services).

Other information:

- Is this a random "one time only" trip or a repetitive trip (as daily to school, or weekly to see a doctor)? Repetitive trips (called "subscription trips" in some countries) continue to be valid week after week until discontinued or changed. Repetitive trips are a big commitment, and schedulers may wish to carefully consider such requests in light of the total schedule to make sure they can reliably fill this particular need. The long-term nature of repetitive trips means that they will likely form the base for the whole schedule, with the random trips slotted in to fill the spaces left after the repetitive trips. This is probably the situation with most of the case study cities included in this guide. It may be appropriate to take a few days to commit to a request for repetitive trips, first promising to call back by a certain time. Random trips can be accepted or denied on the spot, in some cases calling back the rider to arrange the actual pickup time. At other times random trips could be "wait listed" or the rider could be encouraged to call back to see if a cancellation has opened up a slot for a ride.

•Is the fare being paid by an agency? Which agency?

•Will a passenger with a disability be accompanied by an attendant?

•Will the passenger use a mobility device, such as a wheelchair, walker, cane, or seeing eye dog? If using a wheelchair, will the passenger remain in the chair or can the passenger transfer to a regular seat with the chair folded and stored in the vehicle?

•Does the passenger have specific mobility concerns (cognitive, physical, behavioral, difficulty with stairs, difficulty with walking, etc.)

•Who should be contacted in an emergency? (important for disabled and elderly riders)

•Other issues: For example, is a car seat needed for an infant?

An important reservation practice is to repeat back and verify key trip information at the end of each call. If needed, reservationists should get detailed pickup instructions (side door, back door, which entrance at a facility, etc.), especially for large facilities or new trips where drivers may not be familiar with the location.

Images of various types of trip request forms are available on search engines.

Flexibility: Riders should be encouraged, where possible, to be flexible about their trips – and especially "one time" or random trips and with trips where there is not a set appointment time. This permits the scheduler to more easily find a slot for a requested trip, perhaps avoiding a peak hour when the schedule is already jammed. Using "demand management" principles, some paratransit services may limit trips to just certain days or hours in certain localities, including rural areas, in order to more efficiently and less expensively serve their passengers. See the case studies from rural areas in France.

No shows: Some riders may be chronic "no shows," often defined as not being there when the vehicle arrives or cancelling the trip upon arrival or within a certain time (e.g., two hours) prior to the pickup time. There needs to be a clear written policy and procedures for dealing with no shows and passengers should be advised of this policy. For example, a policy might state that after three no-shows in a 3-month period, the rider would be prohibited from using the service for 3 months. Keep in mind that a firm no-show policy will keep the no-show rate low and ends up helping more people get rides.

Trip denials: Keep a record of trips denied (for example, due to lack of capacity) or trips wait-listed and not served. Note the time and date of discussions in the event there is a dispute or miscommunication, so that the scheduler has backup data. A list of denied trip requests, or a waiting list for people to get into the system, can be an important tool to promote expansion of the system. In San Francisco, USA, a documented waiting list of more than 2,000 people was a powerful tool for convincing voters to approve a small increase in the city sales tax to provide the funds to meet this need over a period of twenty years.

Use of attendants: Some systems may use attendants to accompany drivers on routes that have a high number of riders with special needs, or where there are known behavior issues. The attendants help the driver concentrate on driving, and assist or take the primary role in loading and unloading passengers.

### 7.2 Scheduling the trips to be served

Demand-response paratransit services, with their daily service changes, are more difficult to schedule than fixed-route bus or rail lines. Good schedulers – and good scheduling software for larger systems -- provide the flexibility to accommodate changing demand.

Circumstances differ, but in a small paratransit system the scheduler can keep track of all the repetitive and random trips with one of several approaches, such as:

- A large chalkboard on the wall with yellow post-its for the next day's schedule and a notebook for the following days,
- A notebook with a page for each day, or
- A Microsoft Excel-type spreadsheet with a worksheet for each day.

Clearly, large systems will benefit from computerized scheduling, while keeping in mind the costs for procurement, maintenance, and training required to operate such systems.

**An example of scheduling tasks from a typical medium-sized paratransit system**

(1) A typical scheduling system could show each day for the next 2 months, with each day divided up into time slots (for example, 30 minute slots). Each slot could show how many requests can be accommodated during that slot, which depends on the number of available vehicles and the scheduler's knowledge of how many trips can be handled per vehicle in each slot. For example, the scheduler weighs the time taken by short trips against the longer trips which of course take up more of the system's capacity.

The use of the slots on the spreadsheets allows the scheduler to immediately look at the random trip requests and determine if they can or cannot be handled. At the end of each month, another spreadsheet is added for the next month and, in this rolling manner, the repetitive trips are kept in view. Every day, as many random trips as possible are placed into the slots.

Around the middle of each day, the scheduler usually decides which trip requests can be carried for the next day. All the slots are full or accounted for and then the scheduler goes from the spreadsheet to the actual schedule. The service design criteria will dictate how the service is scheduled. For example, if the system is set up in zones, with travel to occur only within a zone, then the zone boundaries will guide the scheduler or scheduling software in linking pickups and drop-offs in a sequential order. Depending on the situation, this schedule is then converted into specific schedules for each day, to be handed to the driver when he/she reports for service. This schedule not only takes

account of the needs of riders, but also includes rest breaks for the drivers, as well as time to fuel the vehicle, return it to the garage or storage area, and so on.

Alternatively, the scheduler could first schedule all the repetitive subscription trips directly into vehicle runs and then place the non-subscription trips directly on these runs between the subscription trips, slowly building an actual schedule for each vehicle as the requests come in. This "scheduling as you go" may help to assure that there is room for all the trips.

All of this may be simple if an agency has a single vehicle, for example to pick up children for a school, perhaps with a single part-time but knowledgeable driver who has the experience to understand the needs of each passenger. There is more complexity once there are multiple vehicles and drivers, for example in a large municipal paratransit system.

The important thing is to do what works for a specific paratransit agency and situation.

(2) Here are some tips on scheduling more trips at lower cost:

- Sometimes, it may be best to start with a trip that is farthest out in your service area and then work your way in toward the center of your area. Sometimes the opposite may be true! In all events, try to minimize circuitous routing, with vehicles zig-zagging all over an area. Try to go from one pickup to other pickups in a straight line or in an arc, if possible.
- Try to group the riders for a single vehicle in as small an area as possible, or else along a corridor (for example, along a road leading to a destination such as a school or work site). For example, mini-bus services to social service agencies might require that riders be grouped, and that a minimum number of riders be guaranteed for each trip from a specific area in order to efficiently fill the vehicle. One tradeoff here is that the efficiency of picking up many riders may lead to overly long trips. In many countries, a trip of more than 90 minutes in a vehicle is viewed as tiring for the passenger and undesirable.
- If part of the vehicle fleet is not wheelchair-accessible, and the scheduler is holding all trip requests and then scheduling them as a "batch," it is a good idea to first schedule trips for the riders who need the more accessible vehicles. Then go on to schedule the longest trips. Then do the shorter ambulatory trips, which will be easier to fit in at the end than the longer trips or the ones needing vehicles that are wheelchair-accessible.
- As time goes by, learn more about the boarding and alighting times of each rider, in order to better schedule the time required for those who board rapidly or more slowly. You will need to know if the pickup is door-to-door or at the side of the street, if the residence is far from the street or adjacent to the sidewalk, if the rider can walk or uses a wheelchair, if the rider requires extensive assistance getting on board the vehicle, and of course allowing time to safely board a wheelchair rider with a lift or ramp and then to safely secure the chair and safely restrain the rider once on board.
- Schedule in the time caused by traffic congestion, based on actual experience. Do not underestimate travel times, as this will cause riders to be late and will undermine their confidence in the system.
- Schedule service using a "window" of time within which the vehicle can be expected to arrive. The rider should be ready to board throughout this period, which could, for example, be from 15 minutes before until 15 minutes after the pickup time. (Say, between 9:45am and 10:15am for a 10:00am pickup).

- Paratransit managers and dispatchers need accurate maps of the service area, hopefully showing the locations of residences by street address ("#42, Street 12") or, failing this, with as much detail as possible so that they can provide accurate information to drivers ("Street 12, house on left of gas station 1.2 km from Avenue 2"). Help the driver with directions if required, but make sure that drivers have a general map of the service area "in their heads," or are using a GPS system to assist them.
- Ideally, the fuel depot and the vehicle storage and maintenance area are at the same spot, so that the vehicle can be fueled either before it pulls out for its daily run or at the end of the day. If the fuel depot is located elsewhere, then the scheduler needs to show exactly when the driver is to take the vehicle to be fueled during the day, at a time when the vehicle does not have passengers and at a time adjacent to a scheduled break for the driver. Kilometers driven without any passengers are called "deadhead kilometers" in many countries. Try to minimize deadhead time and kilometers, perhaps by scheduling the first pickup and last drop-off near the garage or storage area for the vehicle, and by scheduling driver breaks "in the field" rather than requiring the vehicle to return to the garage, unless this is necessary.
- Schedules should take account of the preventative maintenance schedule for each vehicle. In larger systems they should also take account of relief drivers at the end of driver shifts, avoiding deadhead time and kilometers as much as possible by switching out drivers in the field without requiring vehicles to return to the garage.

### 7.3 Dispatching

In a very small system, the scheduler and dispatcher could be the same person, but in larger systems these duties are usually divided. There are different categories of tasks handled by the dispatching function and who performs these tasks may vary. Also, the tasks may vary with the circumstances of a particular paratransit provider.

Recurring daily tasks include

- During the afternoon or evening before service, the scheduler or dispatcher (perhaps aided by dispatching software) prepares final schedules, makes copies of the schedules for the drivers, verifies driver readiness, assigns drivers, assigns vehicles, and coordinates with vehicle maintenance to assure that the correct number of vehicles will be on hand the following day.
- On the morning of service, the dispatcher makes any required schedule changes, gives each driver his/her schedule along with the vehicle keys and cell phone, assures each driver is presentable and fit for duty and wearing any required uniform, assures that the driver has performed a pre-trip inspection of the vehicles, and assures that the vehicle leaves the garage or storage yard at the scheduled time.
- Dispatchers should ideally be in full control of vehicle runs on the day of service. A common mistake is to hand the schedules to drivers and tell them to call in if they have a problem. Ideally, drivers should call in *each* pickup and drop-off, or the system should have a way of knowing where drivers are throughout the day (mobile data terminals, etc.). Dispatchers should then use the latest pickup and drop-off information to *proactively* manage the trips that are coming up in one or two hours, including working in new trip requests and making allowance for "no shows" and trip cancellations. They shouldn't just react to late runs, but manage them by swapping trips to keep runs on time. And they should be assessing delays

or disruptions due to weather, traffic congestion, vehicle breakdowns, and the many other concerns that crop up with any transportation system. The dispatcher should know the location of each vehicle. In larger systems this is best done with a GPS device on each vehicle showing the vehicle location on a screen at the central office, while direct contact with the driver via cell phone or radio may be adequate with a smaller system, provided the drivers are accurate and honest when reporting their location.

- At the end of the service day, the dispatcher assures that the driver conducts a post-trip vehicle inspection and collects the pre- and post-trip inspection forms, collects the vehicle keys and cell phone, assures that the driver has cleared the vehicle of forgotten items and that the vehicle is swept out, and assures that fares have been verified and collected with proper controls.

Readers are again reminded that no two paratransit systems are the same and that this and other sections of this guide may provide "too much information" for small agencies like a single owner-driven vehicle or a small school with one mini-bus, or "too little information" for a large municipal system which will need to invest in sophisticated scheduling software. Practitioners may seek additional resources on our website and elsewhere, and go to "paratransit scheduling and dispatching software" on a search engine such as Google. Paratransit practitioners should be alert to emerging technologies which will enable positive changes in the structure of many paratransit systems in years to come.

### 7.4 Emergency preparedness

Paratransit managers and dispatch personnel should give thought to how to prepare for sudden emergencies, including those for which there is some warning (e.g., hurricanes, typhoons) and those for which there may be little or no warning (e.g., earthquakes, tsunamis). Emergencies can also vary from being of relatively small scope (an accident involving a single vehicle or an incident involving a single person) to very large in scope (e.g., a major flood or landslide). In all such emergencies, vehicle fleets can become a critical element in evacuating entire populations in an area at risk or evacuating or assisting seniors and persons with disabilities who may face special concerns if they cannot get needed medicines, require oxygen, or need knowledgeable personnel to help remove them from harms way. Emergency preparations for paratransit systems should include close liaison with existing medical, police, fire, and transportation agencies, as well as other services. Managers should have up-to-date contact information for such agencies and coordinate plans with them to address emergency situations. Contact lists for those persons with disabilities who may require special assistance should be kept up-to-date along with plans for teaming up personnel to evacuate such persons in an emergency. In a city with well-developed emergency services, paratransit providers can be included in different types of drills to prepare for different types of emergencies. Or, where needed, paratransit providers could *take the lead* in promoting coordinated responses to emergencies.

As this guide nears completion, the USA's Transit Cooperative Research Program is nearing completion of a handbook on emergency preparedness for paratransit systems. Readers may go to a search engine such as Google and type TCRP "Paratransit Emergency Preparedness and Operations Handbook" to view or download this handbook.

**This section was prepared by Richard Schultze**

# Case studies: SAO PAULO'S "ATENDE" & "LIGADO"


## Introduction

Brazil is a leader in Latin America in beginning to seriously work on issues of accessibility to its enormous fixed-route bus fleets. National legislation went into effect in 2004 requiring progress toward full accessibility by 2014. The cities of Curitiba and Uberlandia have led the way, and other large cities – including São Paulo, Rio de Janeiro, and Belo Horizonte – also have made major progress in this direction. The municipality of São Paulo, Brazil, is one of the world's largest cities, with approximately 18 million residents. Its municipal bus fleet is 26% accessible, with some 3,900 buses with features to assist wheelchair users, distributed on the city's 1,300 bus lines. The city also has issued some 250,000 smart cards to disabled persons and seniors ages 65 or over who can ride the bus systems without charge. A small (35-vehicle) lift-equipped taxi fleet provides some 20,000 trips/year, hopes to expand with 15 more vehicles this year, and also hopes to replicate their model in other Brazilian cities. The surrounding State of São Paulo has another 20-30 million residents, depending on how one defines the metropolitan area.

## History

This case study embraces two paratransit systems that supplement fixed-route transport:

(1) Atende, a system within the *city* of São Paulo, was initiated in 1996, and has served as a model for fourteen other cities in Brazil.

(2) Ligado was initiated in 2009, modeled in part on Atende, and serves the larger *state* of São Paulo, which includes São Paulo city along with 39 other cities in the São Paulo metro area, nine cities in the Baixada Santista metro area, and 19 in the Campinas metro area, or a total of 67 cities in an area of extremely dense population. Ligado means "connected" in Portuguese.

## Service Data

Ridership

Atende provides approx. 1.3 million trips per year, clocking some one million km/month on its vehicles. Trip data was not identified for Ligado.

Fares: Neither Atende nor Ligado charge fares. Their service is free.

Eligibility criteria and registration process

Atende provides services for physically disabled persons with severe mobility impairments, who are certified by a physician and who are unable to use fixed route bus or rail services. There are 23 registration centers for Atende services, open weekdays from 8am to 4pm.

Ligado primarily serves children and youth from low-income families, with Down's syndrome and autism and/or who use wheelchairs. Their services primarily provide 1,800 registered children and adolescents, and accompanying persons if required, with services to special education schools, plus providing some trips for health and cultural purposes.

Service Parameters

Atende operates seven days a week, from 7am to 8pm, mainly for health care, rehabilitation, and school trips plus weekend group trips principally for cultural and recreational purposes. The weekend group trips must be scheduled at least a week in advance by agencies serving disabled persons. Atende drivers receive special training, then must drive for three weeks under the direct supervision of a veteran driver before driving "on their own."

Ligado drivers take a special training course, titled "transport for school children with disabilities or reduced mobility." Vehicles must pass a detailed inspection every six months. The primary weekday trip destinations are schools for special education students.

Funding Sources

Atende's budget comes from the operators of some 15 thousand fixed route buses in São Paulo. Atende's services are contracted out by SPTrans to the bus companies providing fixed route services.

The budget for Ligado appears to have a somewhat similar structure, with its funding via EMTU, which overseas the fixed route bus systems in the state of São Paulo. Funds for Ligado are provided by the São Paulo State Department of Education.

Organizational Structure/Staffing

Atende is operated by the City of São Paulo and managed by the surface transportation agency, SPTrans, which contracts Atende's services to local bus companies.

Ligado is operated by EMTU, which manages inter-city transport in the State of São Paulo.

Fleet and maintenance

Atende reports a fleet of 372 lift-equipped vehicles, mainly minibuses.

Ligado reports a fleet of 106 vans and mini-buses, including 80 wheelchair accessible units, with some 80 additional vehicles currently being added to the fleet.

Atende and Ligado hope to integrate their services in the future.

**This case study was prepared by Tom Rickert, based on reports primarily provided by Moacir Mariano da Costa, who is currently the head of Ligado, in 2008 and 2009, supplemented by reports in AEI newsletters and material from the Atende and Ligado websites gathered in 2012. An earlier visit by Rickert to Atende also helps inform these case studies.**

# Section 8: PROMOTION AND OUTREACH

***Purpose of this section:*** *To discuss how to provide information to your passengers, improve service by learning from them, and improve your reputation with the general public.*

**Introduction**

The purpose of outreach by paratransit agencies is (1) to keep current passengers well-informed about your services, (2) to attract additional qualified riders to your system, and (3) to inform local decision makers, businesses, and the general public about how your system benefits the community.

Paratransit information and outreach focuses on several key types of information:

- *Awareness of the system* is increased by branding the system with the agency's logo and name, in concert with the chosen colors of the vehicles, an agency slogan if desired, and by driver uniforms or badges, all of which will hopefully evoke a positive image and enhance the reputation of the system.
- *Service information in provided* concerning the way the system works: Information on how passengers may qualify for certification to use the system, the different types of vehicles that are used, what accessibility options are provided by the vehicles, how to contact the system, how to book a trip and board a vehicle, and about fares and how to pay fares. Information can also be provided about any schedules and routes if the system includes "service routes" or routes which permit vehicles to deviate a short distance to pick up passengers living near the service routes.
- *Opportunities are offered to provide feedback through commendations and complaints* by riders, non-riders, and system employees, and to *comment* on and make suggestions about the service design, fares, vehicles, drivers and specific incidents that may have occurred.

Paratransit promotion and outreach may consist of a wide range of techniques, including word-of-mouth, printed material (brochures, advertisements, mailings), radio and TV. These traditional means are now supplemented by real-time electronic social media and data-sharing via personal communication technologies. Both the traditional and real-time techniques can be used to enhance awareness, provide service information, and promote user feedback. Your use of these means will depend on the service model and the size and goals of your system

**8.1 Traditional and well-proven marketing techniques**

Perhaps the most common form of marketing and outreach is when a person sees or walks by a transit vehicle on the street. Immediately the person will form a positive or negative opinion of the service. Is the vehicle clean and safe looking? Does the driver seem professional and courteous? Do riders getting off the vehicle complain about the service? Such an opinion is formed in seconds. A good paratransit system will work hard to ensure that what a potential rider sees in that first impression is positive. Good maintenance, good driver training, on-time scheduling, and effective outreach all make a crucial difference. And, if the impression is positive, is there information on the vehicle that shows the name of the system and how to contact it for information? Does the driver courteously and accurately provide information about the service and fares if questioned?

Another common form of promotion and outreach is word-of-mouth, when you ask someone about a paratransit service. Is the service safe, accessible, reliable, and affordable? Again, good maintenance, driver training, scheduling, and outreach all make a crucial difference.

Brochures and notices about your system can be produced and distributed at relatively low cost. They can be made available inside and on the outside of the vehicles, at the system office, at businesses, hospitals, government offices, stores, etc. This information should be made available in alternative formats to assure that persons with disabilities can access them. These formats may include large print, signage with proper contrast (e.g., black on white and black on yellow are highly used), Braille, raised letters (for example, for the vehicle number within a vehicle), and text phones. Accommodations can be made for persons unable to read or write the local language by using symbols, colors, and oral assistance.

The paratransit system could choose to purchase a range of small gifts, such as pens, paper tablets, magnets, etc., that have the system name, logo, phone number, website, and Facebook address to provide a way for certified passengers to contact the system and book a ride. Small systems and owner-operated vehicles can have the owner's name and contact information. Information can also be sent out as advertisements and public service announcements via radio stations and TV, although this can be costly. A vehicle with a driver (or manager) can be on display at fairs, market days or shopping centers, or at community events to increase awareness and answer questions.

Vehicles need to be equipped with comment cards, mailing addresses and phone numbers so that passengers can provide their positive and negative comments on the service and make suggestions for improvements.

### 8.2 Social media and data-sharing

Real-time social media and access to real-time service information are changing, improving, growing more available and becoming less expensive. Many potential readers of this Guide will have access to some form of these technologies via computers, tablets, mobile phones and other devices. Depending on your situation, it often will become increasingly cost-effective to tap into these new technologies.

Paratransit agencies often choose to have websites. There are different approaches to make websites accessible according to prevailing access standards. (Go to http://www.w3.org/WAI/ for information on the WC3 web accessibility standard.)

Depending on circumstances, you may be able to reach out to current and potential transit users in the form of information and advertisements on websites and via emails, Facebook, Twitter, Google, and applications ("apps") that become available at little or no cost. Paratransit systems that charge different fares between zones, or limit services to within designated zones, can provide maps for their clientele. Paratransit systems that provide some version of "service routes" along fixed corridors can post routes, maps, schedules, fares, and information on road closures, traffic tie-ups and schedule delays, vehicle breakdowns, projected arrival times of the next several vehicles and associated alerts to be ready for the vehicles, locations of the nearby stops and how to walk or roll to them and time to do so, locations of wheelchair-friendly stops and vehicles, and locations of nearby vehicles and seat availability. This can encourage dynamic and real-time requests for service and pin-pointed dispatching by the transit system. It can dramatically improve the convenience and productivity of the service.

Vehicles can be equipped with GPS and mobile data terminals in order to keep dispatch informed of vehicle locations and to transmit information about pickups, drop-offs, etc. between driver and dispatch. Increasingly, tablets and phones come equipped with GPS which can be tracked by dispatch and information can be easily transmitted back and forth at a cost which tends to decrease as time goes by.

In some situations, smart phones and apps can also be used to (1) locate vehicles in your neighborhood and speak directly with the driver to arrange a trip, or (2) to pay for the service remotely or at the vehicle, with money value downloaded onto phones (for later fare payments) at special grocery and transit outlets. Riders should be encouraged to send in positive and negative feedback on the service via their electronic media.

Hong Kong provides an example of the use of advanced promotion and outreach of both fixed-route and paratransit services. Readers are encouraged to visit the websites found by typing "disability access to public transit in Hong Kong" into a search engine.

### 8.3 Advisory committees

An advisory committee can be an important element of any paratransit system, and becomes critically important for larger systems with a greater need for feedback from their ridership. Advisory committees could include or be entirely composed of persons with disabilities and seniors who are customers of your system. Attention should be paid to including persons with different disabilities (for example, wheelchair users, blind persons, clients with hidden disabilities such as arthritis or a heart condition). The advisory committee could also include representatives from different city departments and agencies. If the paratransit system also serves tourists and visitors, someone from a tourist-related agency could be a member.

Advisors can provide helpful comments on system accessibility, safety, and reliability. The committee could also include representatives of local bus and rail public transportation agencies and promote their accessibility in an integrated manner so that those systems may more inexpensively serve an increasing number of disabled passengers. Advisory committees should be operated in a transparent manner, especially for paratransit systems run by cities or other government entities. Everyone's opinion should be valued, which implies that standards should be enforced so that no one person dominates the committee to the exclusion of the viewpoints of others. Advisors should take their responsibilities seriously and should ideally have written expectations as to their service. The paratransit agency should consider assisting by providing transportation to the advisory committee meetings. Advisors should be "trained to competency" by becoming familiar with the challenges and difficulties facing paratransit providers. Advisory committees not only provide helpful feedback about the quality of service and any emerging problems, but can assist a paratransit agency in forming service criteria which will be more acceptable to the public and will deflect criticism that decisions are being taken without community input.

In San Francisco, USA, the paratransit advisory committee, with more than thirty years of service, has become an outstanding source of experience for reviewing new initiatives and commenting on problems and challenges facing the system, while providing an additional source of promotion of the system that helps assure that funding provided by the city will remain at required levels.

**This section was prepared by Richard Schultze, except Section 8.3 prepared by Tom Rickert**

# Section 9: BUDGETING AND FINANCES

| SAMPLE INCOME & EXPENSE CATEGORIES FOR BUDGETS & REPORTS | |
|---|---|
| Period (month, quarter, or year) | |
| **Income for period** (fares, subsidies, donations & all other sources: categories not shown) | |
| **Expenses for period** | |
| **Labor** | |
| Management | |
| Supervision | |
| Dispatch | |
| Drivers | |
| Maintenance | |
| General & Administrative | |
| Fringe benefits | |
| Total labor | |
| **Materials & supplies** | |
| Vehicle parts & supplies | |
| Radios/Main't & charges | |
| Tires | |
| Fuels & lubricants | |
| Office & miscellaneous | |
| Uniforms | |
| Total materials & supplies | |
| **Services** | |
| Telephone | |
| Vehicle repairs | |
| Towing | |
| Website support & misc. | |
| Total services | |
| **Other** | |
| Insurance | |
| Rents & leases | |
| Vehicle licenses & inspections | |
| Taxes | |
| Vehicle procurement | |
| Computer hardware/software | |
| Utilities | |
| Travel | |
| Special start-up costs | |
| Total other costs | |
| Opening balance (start of period) | |
| Total income for period | |
| Total costs for period | |
| Closing balance (end of period) | |
| Total gain or loss for period | |
| **Service data for period** | |
| Passenger trips | Cost per trip |
| Vehicle hours | Cost per hour |
| Vehicle km. | Cost per km. |

***Purpose of this section:*** *An introduction to budgeting and a short list of key concepts for the financial management of any paratransit system*

### 9.1 Budgeting

A sound financial plan is important for any paratransit service. This includes financing for the required assets, a budget, and a cash flow plan. Systems can fail when owners or agency directors do not anticipate their expenses or have not planned ahead to pay expenses such as taxes, fees, or losses not covered by insurance. Your budget is probably the most important piece since that is the road map you will follow.

For those who plan to start up paratransit services, the box on the left lists categories to consider when you prepare a budget or prepare reports of actual income and expenses. The categories listed on the left may not fit your service and you may need to add or delete line items. Budgets usually are prepared on an annual basis, and reports of actual expenses are often prepared by the month and then by the quarter for easy comparison with the budget.

If this is your very first budget, try to draw on the experience of others who have similar budgets. Keep in mind that your budget is a guide, not a precise measure.

It will help to write down your initial planning assumptions about your annual costs and revenues, fleet requirements, approximate vehicle-miles and vehicle-hours, ridership, and fare revenues and other sources of income. Review these every few months to see if the assumptions need to be changed and updated, if all the costs have been included at the correct amount, and if the income estimates are reasonable. By the end of your first year of operations, and with good record keeping, you will be able to develop a more accurate budget that will continue to be a crucial financial tool. Continue to monitor the costs and revenues against the budget assumptions, in order to keep on track, not spend more than is warranted, and to ensure that the income is sufficient to be sustainable. Coordinate the budget with the projected cash flows in and out, and the cash on hand.

**9.2 Financial management**

Here are some suggestions about financial management when you start up a new paratransit service, company, or agency. These suggestions apply to any system, whether owner-operated or provided by a municipality or by an NGO or other agency.

(1) Be in charge. You need to be in charge of the money and finances. Do not delegate this to someone else. Paratransit owners and managers need to know what is happening.

(2) Keep up-to-date written records and receipts. Keep written records of what you spend, what money you receive, what you owe, what is owed to you, and cash on hand. These include checking and savings accounts, receipts, invoices, bills, etc. If you do not have records, you will not be able to detect or prove mistakes or fraud. If it isn't written down and documented, it is as if it never existed.

(3) Securely store important documents. Keep all important papers in a secure place. This includes your financial records, bank checking and savings account books, registrations, incorporation papers, permits, loans, contracts, vehicle and equipment titles, and leases.

(4) Have enough cash to pay the bills. Forecast when bills are due, employees are to be paid, taxes and government registrations/licenses are due, and when revenues will come in, so that there is enough cash to pay the bills. It is easy to lose track of when bills and wages are to be paid. It is easy to be overly optimistic about when people and businesses will pay what is owed you. Set aside funds to replace vehicles and equipment.

(5) Look for ways to reduce costs and increase revenues. Be efficient in scheduling the paratransit service. Know what it costs to operate. Collect payments that are owed to your agency. Ensure that fares are accurately collected and make their way to your agency without loss. Operate good service that retains and attracts riders. Have all service contracts at least at fully allocated costs. Buy in bulk. Look for discounts. Check out goods and services to see if they will provide what is needed at a good price.

(6) Keep debt under control. Re-finance loans to get better rates. When borrowing, consider legitimate commercial banks, microfinance banks, savings/credit associations, and family, if possible. Avoid borrowing from people that charge unreasonable rates or use unlawful or questionable means of collecting payments. You may need to have a line of credit for working cash. Pay off or pay down debts and credit cards before they are due. Avoid late penalty fees on loans and credit cards. Work to maintain a good credit rating.

7) Maintain vehicles. Do not skip or reduce vehicle maintenance to save money. Well-maintained vehicles will save money in the long run, be safer, reduce accidents, reduce service disruptions, and present a better public image to the riders and general public. Save money some other way.

8) Keep track of fuel, parts, supplies, tools and equipment. Fuel, parts, supplies, tools and equipment tend to be stolen, borrowed or mistreated. They need to be monitored and inventoried

(9) Protect against the unexpected. Insure the vehicles against loss or damage. Insure the operations in case there is an accident and someone is hurt or killed and there is

vehicle or other damage. Owners should consider insuring themselves in case they become injured or cannot lead the organization. Owners can set up written documents to allow a trusted family member, employee or other person to act in their place when they are out of town or incapacitated.

(10) Submit reports on time and accurately. Make sure that all required reports to the government, NGOs, banks, donor agencies, etc. are submitted on time and with all information provided and accurate.

(11) Write down your financial procedures. Write down how you perform the various finance and budgeting tasks, so you can standardize and improve over time, and so you can train others as needed.

(12) Get outside advice and help when needed. Find a successful and trusted mentor that can give you advice on finances. Get assistance from NGOs and government agencies that help small agencies or businesses succeed. If possible, hire a bookkeeper to help you set up the books and to monitor how well you are doing. If you are in a situation where you cannot read or write, have a trusted family member, friend or business associate do that for you, under your direction.

(13) Reputation. Keep your good reputation. Pay your bills on time. Be honest and accurate. Deal well with the public. Be professional.

**This section was prepared by Richard Schultze**

Go to www.globalride-sf.org/paratransit/supplement/financialmgmt.html for Richard Schultze's fuller presentation of this topic.

# Section 10: NGO TRANSPORTATION

***Purpose of this section:*** *To discuss some of the opportunities which NGOs may especially wish to consider as they start up or scale up paratransit services for their clients and for others in the community.*

**Introduction**

This section will focus on ideas which may be especially relevant to NGO transportation for seniors and persons with disabilities, with more of a focus on *urban* areas. Section 11, that follows, will focus more on some of the issues of *rural* transportation.

There are tens of thousands of non-governmental organizations (NGOs) in developing regions. While serving many purposes, the main focus of a great many NGOs is to meet education or health or employment needs which, significantly, would frequently imply the need to procure, operate, and maintain vehicle fleets of various sizes to transport students, patients, employees or others who are unable to reach these services by municipal bus or rail transport.

Clearly, such transportation can be costly to operate and can especially present challenges to NGOs with competencies that do not address the technical challenges of operating paratransit services. One observer states that "After staff salaries, transport is the largest budget item for humanitarian agencies. Much of the money is wasted through inconsistent procurement policies, shoddy maintenance, negligence, road accidents and bureaucratic headaches." . . . (Agencies do not) "consistently implement driver training programmes. Road safety issues are generally not considered as an integral component of relief and development operations. Procurement of vehicles is conducted in an ad hoc manner with only limited regard to the standardisation of specifications and opportunities to leverage reduced pricing and services from suppliers."[10]

Oftentimes, NGOs operate only a single vehicle or very few vehicles. However, taken together, the NGOs in a given city or town might operate a great many vans, minibuses, or other small vehicles. The presence of possible economies of scale opens the way for consideration of some of the suggestions we provide below. Each suggestion has tradeoffs. We are not *prescribing* solutions, but merely *describing* ideas for your consideration.

**(1) NGOs may wish to consider working together to procure, operate, or maintain vehicles at lower cost.**

- Coordination is not a cure-all, but *sometimes* it can result in real advantages and real cost savings. Depending on circumstances, NGOs may wish to consider working together in order to
- Obtain a garage or area for safe secure storage of their vehicles when not in use.
- Negotiate for volume purchase of fuel, using the greater purchasing power that comes with bargaining on behalf of a larger group of agencies.

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10 Rob McConnell, "Sudan: world's greatest humanitarian transport challenge," Forced Migration Review, Univ. of Oxford, November 2005, page 1, downloaded 3/21/12 from www.fmreview.org.

- Negotiate for lower cost maintenance of their vehicles by a commercial source or, possibly, construct a maintenance base to serve their needs, although this would require a history of long-term coordination to support such a major project.
- Contract out for training of their drivers and other staff by a professional training provider, as noted in Section 6, above.
- Work together to *lease* vehicles at a relatively low rate, which may be less costly than owning many small fleets of vehicles. Knowledgeable observers[11] have noted that "NGOs rarely calculate or realise all of the costs inherent in the utilisation of their vehicles, nor do they properly recognise, among other things, relevant procurement, maintenance and training alternatives." For example, leasing one or more vehicles may appear to be expensive, but leasing may free up resources which would otherwise be required to purchase vehicles. Further, it may be possible "to pool resources through an external fund and thereby pay lower interest rates. In particular, a third-party fleet management entity could, if given a sufficiently large purchase order, take that order to a bank and receive a loan at the standard interest rate. . . . NGOs require a financially sophisticated partner organization that can organize market demand and feed that information directly into competent suppliers that are willing to organize bulk leasing schemes," potentially creating savings in vehicle procurement and operating costs. A major obstacle to this type of coordination is that NGOs "rarely have sufficient organizational capacity to negotiate in partnership with other NGOs – an inconvenience complicated by inefficient bureaucracy and complex donor compliance regulations." See 10.5 below for a possible way to address this concern.

An example of an innovative paratransit provider that has worked effectively to promote coordination with other paratransit agencies is Paratransit, Inc., based in Sacramento, USA. Go to www.paratransit.org to learn more about how this agency has grown by providing a range of services far beyond providing rides for its clients. For example, other paratransit agencies come to Paratransit Inc. for maintenance of their vehicles, while the local government uses their services to provide safety inspections of taxis.

**(2) Coordination between NGOs and other agencies may enable these agencies to serve more passengers for more trip purposes.**

Often, NGO vehicles are owned by a single agency, used for specific purposes, and operated during stated hours (e.g., bringing students to a school every weekday morning and returning them to their homes in the afternoon). They may be available for other uses much of the day and this may open up possibilities for sharing services with other agencies. Coordination with other agencies may also lead to economies in scheduling, dispatching, maintenance, fuel, or driver training.

Beyond this, coordination between participating agencies could open the door to meeting additional needs in the community. Disability is increasingly understood to lie along a continuum of functional ability to cope with obstacles in one's environment. And "silo thinking" may occur when we discuss transportation for passengers with disabilities as if this

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11 Citations from Joseph Falit (Jacana) and George Fenton (World Vision International), "Fleet management and the imprudent NGO: A perspective on leasing," pp. 30 & 32, KJAE group, Denmark, downloaded 3/20/12 from www.kjaegroup.com.

is an isolated concern which does not impact other categories of passengers as well. In some cases, NGOs with spare vehicle capacity could provide these needed services.

So NGOs (and for that matter municipal paratransit services as well) could at least consider other uses of their vehicles during times when they are not being fully utilized for agency clients, perhaps by opening the service to additional categories of passengers especially during periods of low demand. For example, revenues might be generated by providing a mid-day service route during off-peak hours that prioritizes senior or disabled passengers, or, indeed, simply serves all passengers who wish to use the service at that time. The problem here is a welter of bureaucratic obstacles, *especially* if NGO or municipal fleets, subsidized by donor or city funds, are seen to be in competition with private transportation providers including informal providers. However, this may not always be the case and then such additional services could be considered.

Cities could foster coordination by establishing a "paratransit brokerage" through a contractor hired to help expand demand-response door-to-door services for disabled passengers. The "broker" could assist NGOs to expand their existing paratransit service by providing service for other agencies without vehicles. NGOs without experience in paratransit provision could work through the broker to identify services for their own clients. The incorporation of NGO vehicle fleets could benefit all parties, with the paratransit brokerage providing professional management skills which could provide more confidence to NGOs and other agencies that their client transportation remained in good hands.

**(3) NGOs may wish to explore hiring commercial transport providers to serve their clients.**

In some cases, private or informal providers could be obtained to provide transportation for NGO clients. This might especially require technical assistance to help less formal providers to better comply with safety and other standards, and it certainly assumes that they would use well-trained drivers and safe accessible vehicles for disabled clients. Sub-fleets of vehicles, such as a company with a fleet of modified auto-rickshaws and specially trained drivers, might be able to effectively meet the needs of most students or patients or employees to get to a school or health center or work site at lower cost than if the school or clinic or employer operated its own vehicles.

**(4) NGO, public, or private sector paratransit providers may wish to sell their transportation services to schools, hospitals, and other agencies that may have the resources to pay for such services.**

Many cities and towns have a variety of schools, universities, hospitals, clinics, and other institutions who service persons with disabilities or seniors, but have no vehicles to help transport them to their services. These existing agencies could be approached to consider purchasing services from provider agencies. If agency A has vehicles to bring disabled clients to their school, with peak hours at 8-9am and 4-5pm, perhaps a kidney dialysis center in the same city could purchase services to bring clients to their center from 9am to 4pm.

Do not first offer the service for free and then try to initiate getting paid for it a year later! It may be too late, as expectations may exist for a service to continue to be free forever. For example, by approaching a for-profit health center *prior* to offering services, you will have a better negotiating position.

**(5) The public sector should consider a spectrum of "mobility management" methods to help the non-profit sector to increase services for disabled and senior passengers.**

Governments in less-wealthy countries may neglect opportunities to assist NGOs because they do not wish to bear the cost of directly subsidizing accessible paratransit provision by such agencies. But there are approaches which are far less expensive and can leverage resources which may already be on hand.

Some of these approaches are noted in (1), above, under coordination between NGOs, but city and other governments could go beyond this to foster coordination by making it more profitable for NGOs to work together. Cities could assist with (1) free or low-cost driver training programs for NGO staff, (2) insurance coverage at lower cost by enabling a group of NGOs to negotiate such coverage after meeting driver training requirements, (3) provision of lower-cost maintenance facilities (or enabling a consortium of NGOs to contract out maintenance at a lower cost), and (4) provision of lower-cost fuel by enabling bulk purchase, possibly at a central fuel depot.

Governments could also help NGOs by defraying the cost of their vehicles. This would be an alternative to purchasing or leasing vehicles in bulk. And this has the advantage of being a simpler procedure while letting governments promote safety by making good driver training a condition for their help, and, possibly, requiring agencies that benefit to then serve larger populations beyond their own client base. But keep in mind that there may be negative tradeoffs if too many "conditions" are required in order to obtain municipal or other assistance – it is a matter of balance.

Our case study of Invataxi in Moscow noted the need that this small startup system had for subsidizing the capital cost of a new vehicle. Many not-for-profit systems would be able to fund ongoing operating costs while filling important roles in the overall provision of paratransit services, if they were to receive assistance with one-time vehicle procurement costs.

A large-scale example of this approach is the "Section 5310 program" of the USA's federal government, that provides vehicles to non-profit and public agencies to assist them to provide paratransit services to persons with disabilities and elders.[12] In 2010, recipient agencies provided over 47 million one-way trips to seniors and disabled persons. The US government provides 80% of the purchase cost and recipient agencies must provide the remaining 20% as well as the funds to operate the vehicles. The US government subsidy per ride in 2010 was only $2.82 per trip, a very low figure which points to the large "multiplier effect" this funding has by enabling agencies to handle the large one-time-only capital cost of vehicle purchases. 75% of the nearly 17,000 vehicles purchased under this program in a recent eight-year period were equipped with lifts or ramps and with on-board securement systems for wheelchair users and other passengers who use mobility aids.

**(6) Foundation and corporation grants could assist in scaling up NGO-operated paratransit services.**

As noted in Section 3 of this guide, foundations and major corporations have often donated vehicles to NGOs around the world to serve their client base. Increasingly, these funding

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12 The editor is indebted to conversations in June, 2012, with Russell Thatcher, Senior Transportation Planner with TranSystems Corp. in the USA, for this example and some of the other ideas discussed in this section.

agencies are aware of the need for sustainable cities with an efficient paratransit component that provides universal access to everyone. In addition to "capacity building" to help NGOs manage their vehicle fleets, foundations and corporations need to consider how to *also* focus their grants to promote mobility management and demand management to scale up accessible paratransit services provided by NGOs and other agencies in less-wealthy countries.

**(7) The use of volunteers, under certain conditions, can also help scale up existing services.**

The use of volunteers in paratransit services varies enormously from one country to another, depending on many different factors. In some countries, and only *when applicable*, volunteer drivers and other paratransit personnel working under proper conditions could increase the quantity and quality of services. For example, volunteers might provide services as attendants on vehicles whose drivers are paid employees. The procurement, retention, and dismissal of volunteers should be handled in a professional manner:

- Volunteers should be trained to competency in their tasks, just like paid employees.
- Volunteers should have written job descriptions, just like paid employees, and should generally comply with the same requirements as employees, especially if they are in "safety sensitive" positions such as driving vehicles.
- Volunteers should have a probationary period when they begin working to assure that the situation meets the expectations of all concerned. Like paid employees, they should be dismissed if their performance is not satisfactory.
- Volunteers should be thanked. Some of the approaches used to commend paid drivers and other employees also apply to thanking volunteers for their services.

In many countries, the use of volunteers is limited by the costs associated with their procurement and retention, and especially by the cost of insurance to cover the actions of employees that insurance companies may regard as less-professionally recruited and supervised.

**This section was prepared by Tom Rickert**

The case study below presents a pioneering paratransit system in Malaysia, organized as a charity and benefitting from professional advice.

## Case study: "PERSATUAN MOBILITI" IN KUALA LUMPUR

by Halimah Abdullah, Founder/Adviser of Mobiliti


**A personal account by the founder of Malaysia's first door-to-door transport for persons with disabilities, shown at left in photo**

It was 6:45 p.m. on a Tuesday evening. I had just left the Mobiliti office and was walking through their outdoor car park when I saw the six Mobiliti vans, all back for the night. Three had just had a fresh coat of paint and were glistening in the glow of the sunset. I had a moment!! Suddenly overwhelmed by just how far we had come in less than five years. Going from an idea to start a “door to door” transport service for the disabled to having this small fleet of vehicles. So how did we do it?

### Getting Started

You only need two things (No - not vans and money, but passion and determination!) OK maybe three things – add on hard work. A strong belief that “God works in mysterious ways” will also be very helpful. Because that is all I, and a group of disabled friends, had when we gathered in July 2001 for the first meeting of what was to become “Persatuan Mobiliti Selangor & Kuala Lumpur” (*the Mobility Association of Kuala Lumpur and Selangor).* We registered as a new charitable agency, a process that took six months.

Registration gave the organization credibility, the charitable status has made fundraising easier and a new organization ensured independent self-management. A non-profit company or a project within an existing organization were other options we considered but dismissed.

Mobiliti is the first “door to door” service for the disabled in Malaysia (and most of South East Asia) so none of us actually knew anything about operating such a service! We used

the six months it took to obtain government approval to get as far up the learning curve as we could. We surfed the internet and we e-mailed relevant overseas organizations who either passed on useful information and/or gave us other useful contacts. That was how we first made contact with Access Exchange International. Theoretical knowledge is very useful but nothing beats “on the ground” assistance. We obtained a one-week consultancy from Ian Jenkinson, the General Manager of Sheffield Community Transport in the UK. Ian donated his time and expertise. The British Executive Service Overseas (BESO) paid for his airfare and all we had to provide was one week’s accommodation. Ian was wonderful. He came loaded down with booklets and documentation for us – down to how they designed their booking request forms and drivers schedules. He helped us with demand management issues, technical questions and basically taught us how to operate a “door to door” service.

**Vehicles & Equipment**

Our first two vans were Inokom Permas, a version of a Renault van. We selected them because of the very high roof and because the back door opened outwards (rather than upwards). Passengers and their wheelchairs come in all different shapes and sizes and many of the other vans just did not have enough height clearance. Our latest two vans are Toyota Hiace – reliable and cheaper to maintain (but the Inokoms still win on space). The Toyotas we bought were also petrol engines as they were cheaper then the diesel version. However, since purchasing them the government petrol subsidy has been reduced which has caused a hike in petrol prices – so we are beginning to realize diesel would have been a better option.

We chose the RICON lift (manufactured in the USA) which is fitted at the rear of the vehicle. The local agent’s main line of business is hydraulic lifts so they are experienced in servicing this type of equipment.

There are no wheelchair restraint systems available in Malaysia nor regulations here on transporting wheelchairs. As transport was to be our core business we agreed that from the outset we should self-regulate and have a reliable, secure system. We selected a floor rail/wheelchair restraint system from Unwin Safety Systems in the UK. Coincidentally around the time of our first enquiry, the Managing Director, Mr. Campbell McKee was planning a visit to Singapore (our next door neighbor) so I arranged to go down and meet him there. Well worth the cost of the bus ticket. There is relatively little maintenance needed and we got the company that installed our lifts to fit the rails.

**Operational Issues**

The capital city of Kuala Lumpur and the surrounding Klang Valley area is home to about 5.8 million people. Not surprisingly, one of our main issues has always been demand management. Who gets one of the limited seats in our vans? We started out with a “first-come first-serve” system. But that simply led to disgruntled passengers. We now operate a system where passengers request transport a week in advance. We call them back 2 days before the date of travel to let them know whether we can assist. Priority is given to low income passengers, electric wheelchair users or those who cannot transfer into a car/taxi, and medical related journeys. We operate Monday-Saturdays, 8:00am to 5:00pm.

Passengers are charged a fixed rate of 3 Malaysian Ringgits (just under US$1.00) for a single journey irrespective of the distance involved – about the equivalent of a bus fare.

The vans can accommodate three wheelchairs and three seated passengers at any one time. So we try to collect three passengers all going to the same or nearby destinations in order to maximize occupancy. A passenger is permitted to have one accompanying care giver.

We employ a full-time Operations Manager and office assistant (who is disabled) and currently have four full-time drivers. We will be employing a fifth quite soon. Our leased van will be driven by volunteers.

The Association is managed by an Executive Committee of 13 people (all volunteers) headed by our President, Mr. Anthony Arokia, a wheelchair user. In fact currently 12 of the 13 member committee are people living with a disability.

**Fundraising**

Income from fares accounts for about 20% of our operational costs so fundraising is a big challenge! Particularly at the outset when all you have is a good idea and no track record. It is important to know your potential donor, what are their eligibility criteria for funds, what, if anything, do they want in return (PR opportunities, logo on your vans, financial reports). Our first van was donated by the British High Commission with the lift and rails funded by HSBC. The Catholic Church's Jubilee Solidarity Fund paid for the second van and it's modification. Exxonmobil gave us a two year fuel grant. Operational expenditure came from small donations given by a number of mainly corporate organizations. We spent just US$30 on our office (for file shelves). Everything else was donated.

Once the service was up and running and people could see what a difference it was making in the lives of disabled Malaysians, fundraising became slightly easier, but no less time-consuming. The third van came into service in mid 2004 (funded by HSBC – they like long-term relationships rather than one-off donations – and so do we!) with modifications funded by one of our Rotary clubs. This year we added three more: a second-hand DHL van, a new van funded by BAKTI (a Government Ministers' wives charity foundation) with modifications by a Malaysian construction company, SP Setia. Our sixth van was given to us on free lease by the Malaysian Council for Rehabilitation who were underutilizing it and felt Mobiliti was better placed to operate it.

We want to maintain the fleet at this level for some time as we need to consolidate resources before taking on any more. We have however just signed a long-term agreement with Allianz Life who will fund the operating expenditure for three of our vans. So that is a great help.

The reality is, however, that no matter how many vans we operate we are unlikely ever to completely meet the transport demands of the disabled population, so Mobiliti is also now becoming involved in work pressing for more accessibility in the public transportation system. We are also trying to support groups to start "door to door" services in other parts of the country so that Malaysians living with a disability can participate fully in economic and social activities and have access to community services no matter where they live.

For information about Mobiliti, visit www.mobiliti.org.my.

This case study first appeared in the June 2006 issue of *Accessible Transportation Around the World,* the newsletter of Access Exchange International.

# Section 11: RURAL PARATRANSIT

***Purpose of this section:*** *To present ideas concerning the design of pedestrian infrastructure in rural areas, comments on access features for vehicles in such areas, and possible service models that could address issues of meeting paratransit needs by managing demand for travel in a more efficient manner.*

### Introduction

The contributors to this guide are generally oriented toward accessible urban transportation and hold no special qualification to address the even more difficult situations found in rural areas, especially in regions which may be lightly populated, mountainous, and lacking in roads and transport infrastructure. In such regions, the issues associated with disability tend to merge with issues of poverty and accessibility in general and the difficulty which everyone has to get goods to market or to get to schools, jobs, or health care. In addition, the distinction between paratransit and other public transit modes may fade away in some circumstances. Rural transportation especially is a challenge for people needing travel between villages and district or market towns. This "intermediate travel" is often a missing link making it impossible to reach bus routes, where the vehicles usually lack accessibility features. There are many studies concerning rural transport needs,[13] and this section provides some additional ideas for consideration by readers of this guide.

### 11.1 Design of pedestrian footways and facilities

The ability of everyone to access pedestrian footways and river crossings is especially critical in rural areas where walking, or using a two-wheeler or animal-drawn transport, is the main means of travel. Different actors (stakeholders) in a community or region could establish a working group to assess footway needs and their long-term maintenance needs, and make modest but ongoing improvements every year. In some cases it may be necessary for citizens to volunteer their labor or contribute funds to make pedestrian pathways more accessible and to work with local transport providers to encourage inclusive transport serving as broad a range of passengers as possible. Even under these difficult circumstances, there is a need to set goals and proceed in a step-by-step way to plan and implement actions to meet these goals. Annual maintenance budgets must be established if improvements to pedestrian pathways are to be seriously addressed.

(1) Special attention is needed to assure the separation of pedestrian walkways from roadways in order to decrease the danger of pedestrians being injured or killed by vehicles. Persons with disabilities and older persons are especially at risk.

(2) Ideally, footways needed by disabled persons should be at least one meter wide and as flat and well-surfaced as possible, with some type of support (railings of wire or rope, for example) where the grade exceeds 1:12.

(3) Even when roads are unpaved, pedestrian access to bus and mini-bus stops may be inexpensively improved using 1-2 meter long and brightly colored concrete "curb pieces" which reach about 15-20 cm above ground level. This would identify the bus stop for

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13 For example, see "Accessible Transport and Health of Persons with Disabilities in Rural Areas of India" (by Leonard Cheshire International - South Asia Regional Office, prepared for the IFRTD, 2007), go to http://www.mobilityandhealth.org/case/MobilityandHealth_final report_IndiaLCI.doc.

everyone, make it easier to identify by persons with low vision, help blind passengers to safely position themselves behind the stop, help disabled persons to reach the first step of the bus if the driver is properly trained to stop adjacent to the curb piece, and generally keep intending passengers more safely off the road. This approach needs research, as it would require enough road maintenance so that buses would not dig ruts adjacent to the curb piece or "widen" the road by moving away from particularly hazardous ruts, thus making the curb piece irrelevant.

(4) Rural bus stations (e.g., at villages served by daily or weekly bus service) would benefit from all-weather shelters to protect waiting passengers. For example, Cuba evidently provides facilities for disabled persons at some of their rural bus stations.

### 11.2 Vehicle design

Vehicle design is a major concern for all transport modes in rural areas in less-wealthy regions. While many cities are including access features as they upgrade their bus fleets, the less-accessible used vehicles that are replaced then often enter a second hand market where they are passed on to provincial or regional towns. And as road improvements permit long-distance buses to better serve inter-city travel, they may cease to serve smaller communities. However, even in the absence of access for passengers who must remain in wheelchairs while travelling, there are several low-cost improvements that can be made with existing vehicles in order to better serve other persons with disabilities, while those who can afford wheelchairs must typically rely on others to help them on board and stow their wheelchairs.

(1) Different versions of three-wheeled cycle-rickshaws and motorized auto-rickshaws are major travel modes in some rural areas. Their low floors are especially helpful. Minor design changes (see Section 1 and the case study from New Delhi) may help these transport modes better serve disabled passengers. These and other vehicles will become more valuable for paratransit use if passengers have mobile phones and call centers are available. If passengers are unable to call ahead for service, a local NGO or other agency may be able to place calls to reserve trips. The photo at left shows a cycle-rickshaw in rural Nicaragua.

(2) Better hand grasps, with railings parallel to slanted steps on the *exterior* entrances to truck bodies, will assist mobility-impaired passengers (and everyone else) as they enter the vehicle, as shown in the photo from Cuba at left.

(3) Hand grasps on *both sides* of bus and mini-bus *interior* stairs will allow mobility-impaired passengers to use their upper body strength, even if this strength is mainly on one side of their body, to navigate any stairs into and out of a vehicle. (Note that if grasps are only on *one* side, they would fail to serve such passengers if they both enter and depart out of the same door.)

(4) Color contrast of handrails and other key surfaces inside a vehicle will help those with low vision (and everyone else) to find seats or hang on while the vehicle is in motion. Large print destination signs will also help such passengers, especially if there is good color contrast (black text on a white or yellow background is often best).

(5) Where training is not available to bus or rickshaw drivers, the pocket cards and other means presented in the World Bank's *Transit Access Training Toolkit* may be helpful. (See Section 6)

(6) Authorities may have less ability to enforce vehicle regulations in some rural areas, but a requirement to periodically inspect vehicle tires, brakes, and lights should be enforced as a minimum.

### 11.3 Cost-effective service models for rural paratransit services[14]

Route deviation: One approach toward providing paratransit in low-density areas is to have vehicles operate on a set route with scheduled stops, but permit them to go off the route up to a stated distance (for example, 1 km) in order to pick up passengers who have requested a trip. This approach can be further modified so that vehicles will deviate from the regular route but only to pick up passengers who have requested a ride from pre-established stops off the route. Clearly, this requires interaction with the community served in order to plan where to locate the stops. Further variations on the concept of "route deviation" would permit vehicles to deviate along certain segments of a route (e.g., at the end of a line) or certain hours (e.g., at hours of low demand, not at peak hours).


Managing demand: There are also innovative ways to reduce the cost per trip by "bunching" trips at certain times and places, that is, by concentrating the trip demand at specific times and locations. This permits potential passengers to request trips, or be on hand at stops along routes, at stated times. Service could be available just a few times a day, or once a day, or perhaps only one or two days a week or even month, but at least the passengers could plan ahead (e.g., to schedule medical appointments in a district town). The illustration provides an example of how the three circled rural areas each receive service at different periods during weekdays, and the vehicles ply between these communities and connect with a nearby city in order to meet their schedule. Where paratransit service is sharply limited, it follows that service may serve multiple needs of many passengers, including seniors and those with disabilities with various trip purposes.

**This section was prepared by Tom Rickert.** Photos are by Tom Rickert (Nicaragua), Kit Mitchell (Cuba).

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14 This discussion is based on a conversation in June 2012 with Russell Thatcher, Senior Transportation Planner with TranSystems Corp. in Boston, USA, and on a paper co-authored by him with Ken Thompson of Easter Seals Project ACTION in Washington, DC, for presentation at TRANSED, New Delhi, in September 2012. The illustration is based on a graphic from the website of Mason Transit in rural Washington State, USA, and is taken from this paper with permission.

The case study below illustrates how these principles are applied in rural and semi-rural areas of France.

## Case studies from rural and semi-rural paratransit: FRANCE

**Introduction**

Improving mobility conditions is a major issue in sparsely populated areas. The low population density in these localities often means that longer journeys are required to access services, carry out everyday activities or maintain social links. Whole sections of the population – in particular older people, young people, stay-at-home parents in single-car households, and seasonal workers – are effectively handicapped in mobility terms through inadequate public transport provision and an overdependence on people who have cars. Demand-responsive transport (DRT) can provide a solution that is particularly suited to these areas, thanks to its flexibility, its ability to adapt to local contexts, and the fact that costs can, to some extent, be controlled.

The development of demand-responsive transport in sparsely populated areas generally occurs because these areas present one or more of the following characteristics:

(1) Services, shops and local authorities are often spread between a number of key town or village centres. This means that the mobility needs of the population – which is dispersed in the surrounding areas – are all the greater.

(2) Regular bus, coach or train service may not exist, or, if such service does exist, it may be on too large a scale (interurban services, typically), meaning that they do not adequately serve local needs.

(3) The population is small, and the transport authorities have limited resources. Transport authorities therefore need to find more flexible and more appropriate transport solutions.

Demand-responsive transport can be considered as a way of optimising transport in order to meet the needs of rural or semi-rural areas and ensure that the transport services on offer are suited to the areas and populations in question.

**History**

The right to transport is enshrined in French legislation, in particular the law known as "LOTI" (Loi d'Orientation des Transports Intérieurs – Framework law on inland transport), passed in 1982. However, the application of this law is a delicate matter in sparsely populated areas, as conventional public transport services are not always suitable: high-volume transit, the fundamental principle behind these services, is not applicable here, as the population is too widely dispersed. Furthermore, it is becoming more and more difficult for these services to meet increasingly complex and individualised mobility needs. Nevertheless, there is a real demand for mobility in these areas (whether for leisure, shopping or work purposes), together with growing concerns regarding sustainable development. Indeed, faced with the challenges of sustainable development, noticeable changes are being made to transport policies. Now, the objective is no longer to adapt supply to an ever-fluctuating demand, but rather to try to concentrate and direct this demand towards economical, efficient and environmentally friendly forms of mobility.

**Examples of service** and how service parameters are adapted to meet specific conditions, such as travel to district towns on market days or by recommending certain days and times to passengers.

**(1) The Petit Pégase Network in the Mayenne Department**

The Petit Pégase ("Little Pegasus") service, organised by the Mayenne departmental council, operates on weekdays and Saturday mornings and enables residents to travel from their home to destinations in almost 250 towns and villages, both within and outside the department. Fares are based on a system of eight sectors. Bookings must be made via a central mobility switchboard, by 4pm on the day before travel at the latest.

**(2) A special DRT service for the Nogent-le-Roy market**

Since spring 2007, the Quatre Vallées district council in Eure-et-Loir has been operating a demand-responsive transport service on Saturday mornings specifically for the weekly market in Nogent-le-Roi, the main town in the district. In conjunction with local taxi firms, the service operates five different routes. Bookings can be made via an operator up until Friday noon.

**(3) Abbeville: A DRT network backed up by a mobility switchboard**

In the Abbevillois district (in the Somme department), most rural communities are served by DRT lines that are integrated into the urban public transport network, enabling users to travel into the centre of Abbeville. This network has one particularly innovative aspect: since December 1997, it has been operated via a central mobility switchboard, which, in addition to taking bookings, offers a certain number of other services – and information – regarding the various forms of transport available in the area. In all, more than 40 taxis are involved in these DRT services. Costs include expenses associated with the purchase of vehicles, and the fact that these vehicles cannot be used for other purposes, as well as costs resulting from drivers or vehicles being kept on standby. However, the transport authority can control costs associated with the operation of the service, in particular by encouraging passengers to group together in the same vehicle or even by recommending the use of DRT services on certain days or at certain times.

- From CERTU, *Factsheet No. 1, Tools for mobility*, February 2009, "Adapting public transport to local specificities." These materials were forwarded to AEI by Maryvonne Dejeammes of CERTU in Lyon, France.

Readers are also invited to review a case study from Hong Kong on our website at www.globalride-sf.org. Go to the January 2007 issue of our Newsletter in the "Newsletters" section.

# ADDITIONAL RESOURCES

**Resources on the topics covered by this Guide are increasingly available simply by typing key words into a search engine such as Google. The resources below are supplemented by the detailed material prepared by Richard Schultze, especially prepared to supplement the sections of this guide. For his materials, please go to Access Exchange International at www.globalride-sf.org/paratransit/supplement.**

### General resources

AEI (Access Exchange International): General resources on access to all public transportation modes at www.globalride-sf.org. 130 links to annotated resources in nine languages in more than twenty countries.

DfT (Department for Transportation, UK). Go to www.dft.gov.uk for publications on most fixed route and paratransit modes.

ORN 21: An introduction to access to all modes of public transportation is found at *Enhancing the mobility of disabled people: Guidelines for practitioners*, by CJ Venter, J Sentinella, T Rickert, D Maunder, and A Venkatesh. Published as Overseas Road Note 21 by TRL, Ltd. of the United Kingdom as a project of the UK's Dept. for International Development. Go to http://globalride-sf.org/pdf/ORN21.PDF.

Project ACTION: Easter Seals Project ACTION (USA). Multiple publications are available at www.projectaction.org.

TCRP: Go to www.tcrponline.org for paratransit publications of the USA's Transportation Cooperative Research Program.

TRB: Transportation Research Board (USA) at www.trb.org. Reports and publications on most of the topics included in this guide are available upon typing "paratransit" in the search box at www.trb.org.

In addition, the following specific sources may be helpful.

### Service models and new technologies

EMBARQ: World Resources Institute, at www.embarq.org, for news and reports on transport, paratransit, and pedestrian modes, including motorized auto-rickshaws

ITDP: Go to www.itdp.org/documents/2_and_3_wheelers_in_India.pdf for this report from the Institute on Transportation Development and Policy

ITF: International Transport Forum at www.internationaltransportforum.org for their publication, *Improving Access to Taxis*

Project ACTION (above): Go to "Resources," then "taxi services"

### Eligibility screening

TCRP (above), for R Weiner, Synthesis 30, *ADA Paratransit Eligibility Certification Practices*, at http://www.transitaccessproject.org/InternalDocs/Paratransit/tsyn30.pdf

World Health Organization: The International Classification of Functioning, Disability and Health (IFC) is available at http://www.who.int/classifications/icf/en/

**Planning and performance monitoring**

AEI (above): *Making Access Happen: Promoting and Planning Transport for All*

AEI (above): *Transport for All: What Should We Measure*

Project ACTION (above): Go to "Resources," then "planning"

**Vehicles, wheelchair safety, and maintenance**

TCRP (above): Report 109 on bus maintenance practices

Paratransit, Inc., to learn about an innovative approach to maintenance at www.paratransit.org

**Staffing and training**

ITF (above): *Improving Access to Public Transport: Guidelines for Transport Personnel*

Project ACTION (above). Multiple publications on this topic include

- *Rights and Responsibilities of Transit Customers with Disabilities*
- *Taxicab Pocket Guide*
- *Transit Operator's Pocket Guide*

World Bank: *Transit Access Training Toolkit*, http://go.worldbank.org/MQUMJCL1W1, compiled by T Rickert

**Scheduling, dispatching, and operations**

Project ACTION (above) for *Innovative Practices in Paratransit Services*

TRL Ltd.: RJ Tunbridge & CGB Mitchell, *The preliminary design of many-to-few dial-a-bus services*, TRRL Laboratory Report LR789 at www.trl/co/uk/library/reports_publications/

**NGO transportation**

Paratransit, Inc. (above) to learn more about the coordination activities of this innovative paratransit provider

**Rural paratransit**

Animal Traction Development, at www.animaltraction.com

International Forum for Rural Transport and Development (IFRTD), with their *Forum News* available at www.ifrtd.org

ORN 21 (above): See Part 3, Sections 5 & 6 on "Pedestrian footways" and "Street crossings," pp. 75-91 and Section 10 on "Mini/midibuses," pp 127-135.

# CONTRIBUTORS TO THIS GUIDE

We thank the following for contributing or reviewing the content of this publication.

**Publisher: Access Exchange International (AEI), San Francisco.** AEI is a non-profit agency with twenty years of experience in the promotion of all modes of accessible public transportation in less-wealthy countries. The Board of Directors of AEI is composed of Marc Soto, President; Cheryl Damico, Vice-President; Bruce Oka, Secretary; Lucy Crain, Treasurer; Ike Nnaji; Tom Rickert; Peter Straus; Richard Weiner, and Susan Worts.

**Editor:** Tom Rickert, Executive Director of Access Exchange International. Tom was Paratransit Coordinator for San Francisco's municipal transportation agency for ten years prior to stepping down to found Access Exchange International in 1990. Since that time, he has reported on paratransit services in dozens of countries in the AEI newsletter and made presentations on accessible public transit modes in twenty-five countries. Tom prepared several sections of this guide.

**Main contributor:** Richard Schultze wrote several sections of this guide and contributed to several others, based on his thirty-five years of experience in public transportation. Richard recently retired from his position as Executive Director of the Greene County Transit Board (State of Ohio, USA). Richard's contributions to the guide summarize his more detailed document which is posted on our website at www.globalride-sf.org/paratransit/supplement, for use by those who wish to go into greater detail concerning topics introduced in the guide.

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