Overview

V7.0 – March 2017

This document describes the SmartMove dispatching system.

SmartMove uses the mobile phone (cellphone) network and the internet for all communication. Not only does this eliminate the significant costs involved in setting up a radio network but it provides great flexibility in the operation of the fleet.

SmartMove is more than just a dispatching system. The unique Docket Killer product greatly simplifies the bookkeeping associated with running a fleet, while the reports provide a level of detail which is impossible to provide with a traditional radio-based system.

Contact details for more information are given at the end. Note that the entire SmartMove system can be demonstrated over the internet.

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Feature Summary

SmartMove is a state of the art system that supports the whole business – it is not just a dispatching system. The main features are listed below along with a reference to the section where the topic is discussed in more detail.

1. Communication with vehicles is done using the GPRS data links on the mobile phone. Cars are in contact with the network wherever there is mobile phone coverage; no infrastructure is required (towers, transmitters, etc); and the increased bandwidth allows more data to be transmitted and recorded. [2.1]

2. Each car has a separate link to the dispatching computer. Communications to the car is largely unaffected by other activity. [2.1]

3. All vehicles are tracked in real-time and all position data is recorded. This can be used for various quality assurance functions. [3.3]

4. Every significant event involving the driver is recorded and instantly available for analysis if required. This includes meter on/off, job resubmit, no-show, messages, calls to base, etc. [6]

5. The entire system is based on the internet. This means that bookings can be taken anywhere, the vehicles can be anywhere with mobile phone coverage, and reports can be generated anywhere. This allows fleets to outsource the booking function but handle other functions (quality assurance, bookkeeping, etc) locally. Owners and drivers can also have some access to data. [2.2, 6]

6. The software is designed from the ground up to allow a call centre to manage more than one fleet. [2.2]

7. Registered users can use the ExpressBooker web site to make and manage bookings. The users are connected directly to the SmartMove dispatching computer and no operator intervention is required. The web site can also be set up for public access but only to make bookings. [4.5]

8. Passengers can book and pay for the trip with the SmartHail booking app or branded equivalent. [4.7]

9. Various methods are available for a push-button booking: QuickCab, Taxi Butler and bt.tn. [4.8]

10. The out-of-car alerting lets a driver leave the car without missing out on work. [3.1]

11. Drivers can make bookings. [3.1, 4.4]

12. Drivers can get in-vehicle navigation instructions based on Google Maps. [3.1] Alternatively drivers can use the navigation on their own smartphone. [3.4]

13. Automated bookings can be made with the SmartVOIX phone system. [4.2, 7.4]

14. Set-up costs are minimal because no significant infrastructure is required. [2]

15. Using the query channel does not block data traffic. [2.1]

16. A vast amount of data is recorded and a comprehensive set of reports can be provided. [6]

17. Software upgrades to cars are done remotely with virtually no interference to operations. [8.2]

18. The DocketKiller bookkeeping functions significantly reduce the effort involved in managing financial paperwork. [5]

19. Credit cards can be billed if the card details are supplied at the time of booking. [5.8] Alternatively passengers booking with the app can pay with the app. [4.7, 5.8]

20. Repair is done by replacement which leads to very minimal downtime in the event of failure. [8.1]

21. The system is highly configurable. Options, timeouts, zones, etc can all be easily changed. [3.2, 6]

22. Training is provided in the vehicles with a driver guide and a comprehensive set of tutorials. [3.1]

23. The system learns new addresses. The locations are learnt as jobs are done. No setup time is required. [4.1]

24. The SmartVOIX phone system allows call centres to be linked. [7.4]

25. The fare calculation screen provides an accurate estimate of the fare. [4.1]

26. Drivers can change a job before resubmitting it. This means that drivers to not have to call the base to make changes. [3.1]

27. Performance reports use the time the vehicle arrived at the pick-up address, not the time when the meter was turned on. [10]

28. When using the SmartVOIX phone system recordings are linked to bookings and can be retrieved very rapidly when required. [7.4]

29. Time changes as a result of daylight saving adjustments are handled automatically. [8.4]

30. The panic (duress) button can be tested without needing to notify the base operator. [3.1]

31. In a real panic situation the operator can monitor the conversation in the car. The driver can enable two way communication if required. [3.1]

32. The SmartDriver phone app provides drivers with various features when away from the vehicle, including the ability to read messages and tentatively accept a job offer. [3.4]

33. Shift restrictions can be enforced and a logbook generated on request. These features are primarily for New Zealand fleets. [3.1]

34. A driver can "plot" to a zone. This prevents an empty car being sent to the zone. [3.2]

35. A driver can blacklist a passenger and a passenger can blacklist a driver. [3.1]

36. Booking qualifiers can be attached to an address to assist the operator with bookings for that address. [4.1]

1. Introduction

SmartMove is a state of the art dispatching system. It combines the power of the internet with the reach of the mobile phone network to provide what is arguably the most sophisticated dispatching system available today.

A key feature of SmartMove is that the booking operator, the dispatching computer, and the cars are all linked using the internet. The operator can be anywhere there is an internet connection and the vehicles can be anywhere there is mobile phone coverage. It all works seamlessly.

The software is ideally suited for call centres as an operator anywhere can handle any number of fleets. This opens up possibilities not previously possible. A fleet can handle its own bookings during the day and hand over to someone else at night, for example.

SmartMove strives to be a leader in the market. New features are constantly being added and all users benefit from each new release. Upgrades come automatically as soon as they are released.

SmartMove consists of four main components built around an industry standard SQL database, as shown in the following figure. These four components are described in the following sections.
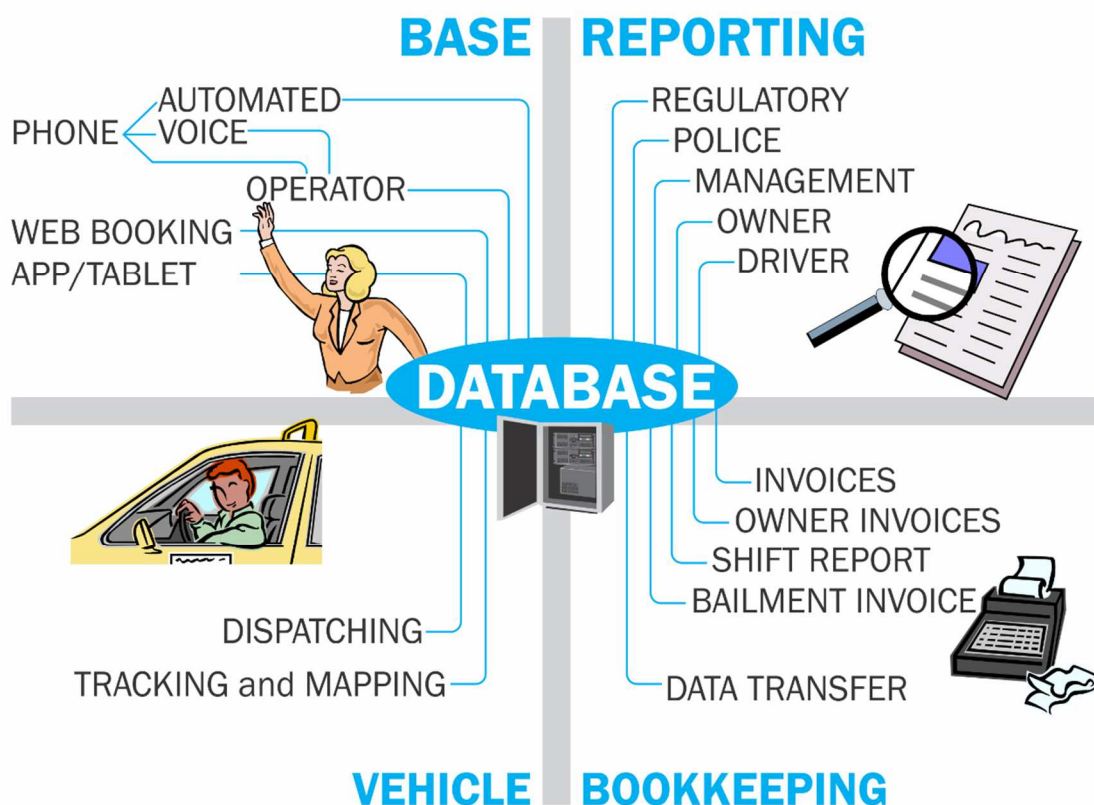
2. SmartMove communication

2.1. Vehicle communication

SmartMove differs from many other dispatch systems in that it uses the mobile phone network instead of a private radio network. All communication between the dispatching computer and the vehicles is done using the GPRS[1] service on the mobile phone network.

This is a significant distinction with several main benefits:

- Fleets do not need to maintain any communications equipment. The phone carriers take over that responsibility.

- Cars can be monitored and controlled wherever there is mobile phone (cellphone) coverage.

- The GPRS service has greater "bandwidth" than a traditional radio network. This means more data can be collected which in turn provides the opportunity for a much more extensive range of analyses covering the activities of all the vehicles at all times.

The mobile phone network is designed to handle a very large number of communications links simultaneously. This is a major point of difference with existing radio-based dispatching systems as there is a separate data link to every car which is open virtually all the time. All the links are independent and the use of one link does not affect the operation of other links. Thus one car might be getting a message whilst one or more other cars are being offered work. The end result is that work is dispatched more quickly. This is particularly important when several cars become available in a short period of time and there is a backlog of work.

The GPRS link is open whenever possible and the communication between the vehicle and the dispatching computer is usually immediate. If the link is broken for any reason – typically when a car goes out of coverage – the vehicle will reconnect automatically as soon as possible. Any data waiting to be sent to or from the vehicle will be sent when the link is re-established. The cars are normally fitted with two SIM cards from different carriers to ensure continuity of service in the event of a failure in one of the networks.

A "voice channel/query channel" is also available. This is done as a hands-free mobile phone call using the microphone and speaker built into the screen. The data link remains open and work can be sent whilst the driver is talking to the operator.

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[1] GPRS = General Packet Radio Service. Data link provided on the mobile phone network. Used to send job details, messages, location data etc. to and from vehicles.

2.2. Base communication

In many cases the computer handling the dispatching is not in the base itself – it is held in a high-availability data centre. The communication from the base operators to the dispatching computer is over the internet. This arrangement is shown in the figure below.
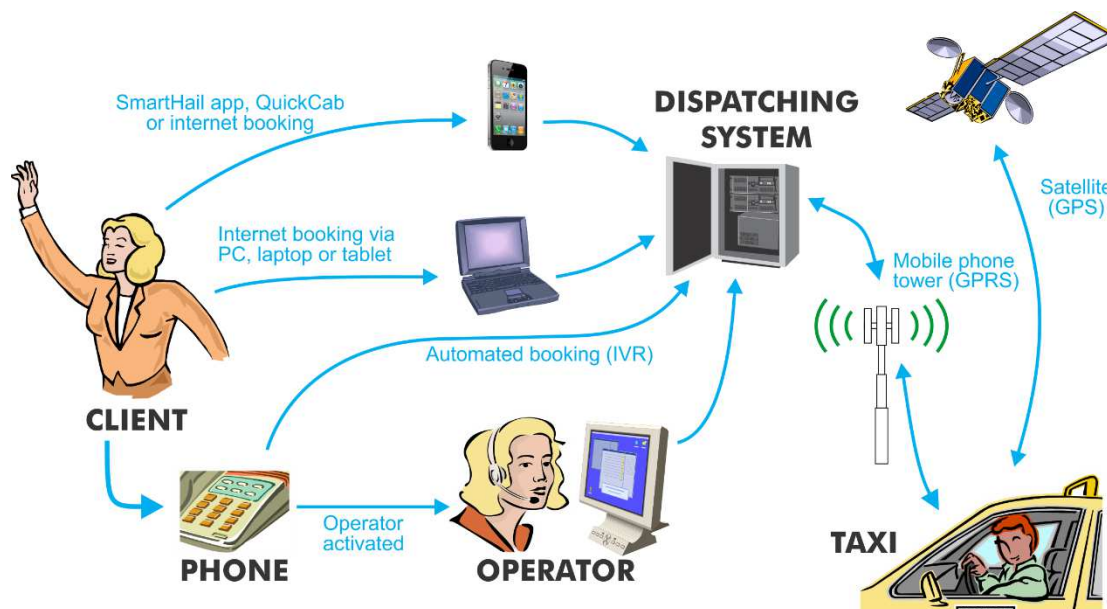
Bookings can enter the system in a variety of ways – described in section 4 – but ultimately the bookings are processed by the dispatching computer. The cars report their position regularly and work is allocated to the most appropriate car. More information on the dispatching rules is given in section 3.2 below.

The dispatching computer is housed in SmartMove's Adelaide office. The database is replicated to SmartMove's second office in near real-time and this second site can take over the dispatching role if there is a major disaster at the primary site. Both sites have battery backup and a generator that will start automatically if required.

3. SmartMove for the driver

3.1. Driver features

Information for the drivers is displayed on a screen designed for ease of use. Icons (pictures) are used wherever possible to minimise the use of written text. All information supplied to the driver is displayed in a readable form on the screen in a relatively large font. This reduces the possibility of drivers misinterpreting the information.

Much of the training is provided in the vehicle in the form of short tutorials that drivers can watch during quiet times. The tutorials are a few minutes long and cover all aspects of SmartMove – the main concepts, how to use the equipment, and how to investigate faults. A printed driver guide is also supplied.
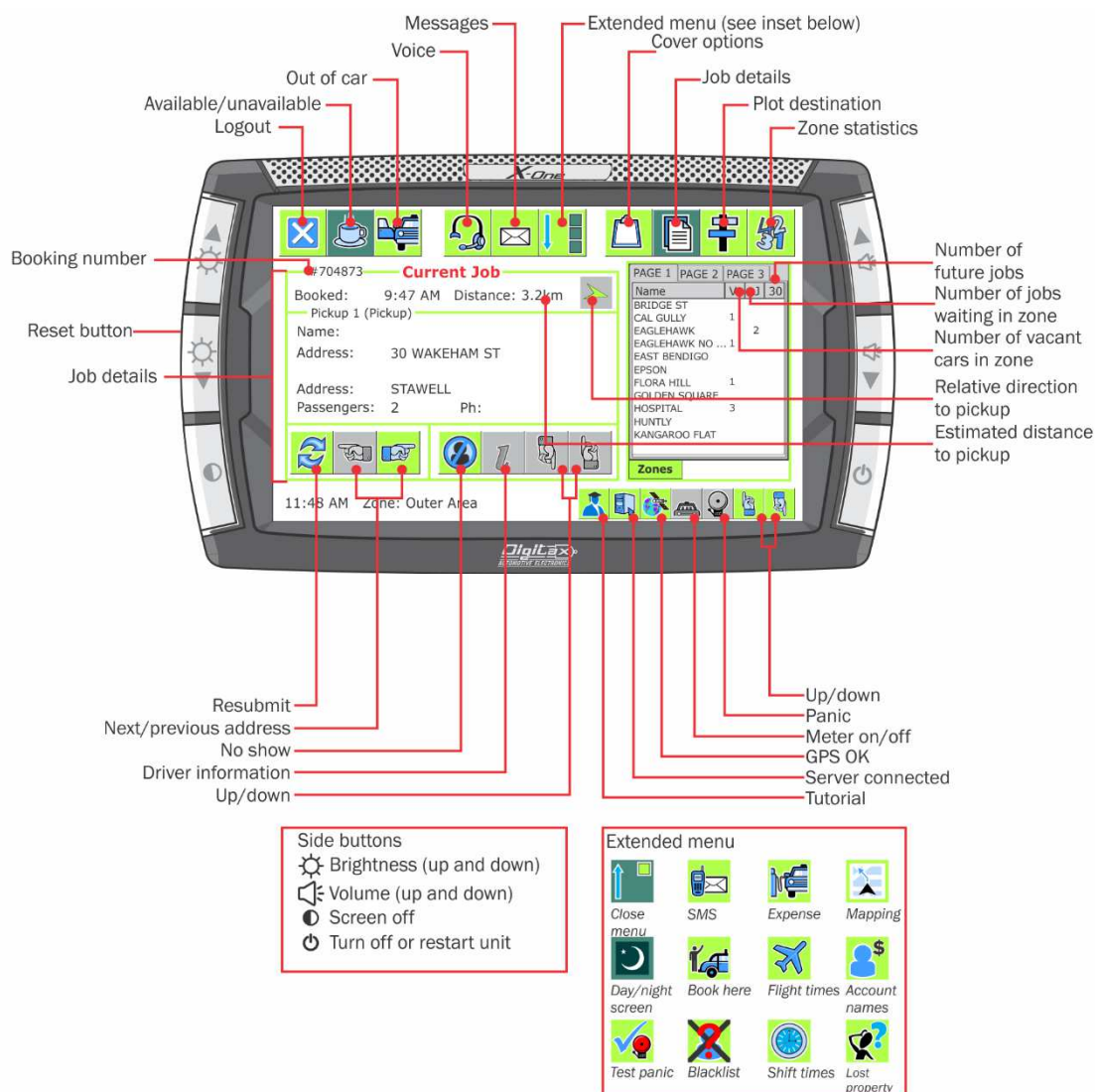
The standard mobile data terminal (MDT) is shown here. It is manufactured in Italy by Digitax. SmartMove can also be used on a suitable Android device, phone or tablet, but not all the features described in this document are available on the Android version.

The MDT can be connected to any of the standard meters used in Australian and New Zealand. Alternatively the meter built into SmartMove can be used provided it meets local regulatory requirements.

A panic (duress) button is fitted to allow the driver to discretely request help. If desired the other drivers in the fleet can be notified that the button has been pressed and get the location of the vehicle. The base operator can initiate a call from the vehicle to monitor conversation in the vehicle. The operator cannot talk to the driver however if the driver presses the panic button a second time the speaker in the vehicle is turned on and the driver can then hear the base operator.

The base operator must follow the approved procedure for handling a panic situation – this might include notifying police and/or notifying other cars. The panic alarm must be cleared by the base operator. A special screen allows the driver to test the panic button without the need to warn the base operator first.

Messages can be sent to a driver and, if required by the base operator, the driver can send back a response to a question. For example the base might send the message "Are you available for a trip to the mine?" and the driver can reply "yes" or "no". The time each driver reads a message is recorded along with any response. In addition drivers can send a message to the base operator.

The "out-of-car" feature is unique to SmartMove and is very popular with drivers. This allows a driver to leave the car and be notified that a job offer is being made. SmartMove "pranks[2]" the driver's phone to signal that work is available. The driver cannot accept the job on the phone[3] but must go back to the car to accept the work. A longer time is allowed to accept the job – typically 60 seconds – and the job will be offered to another car if the driver does not accept the work in time.

The system can be configured to allow a driver to call a passenger. It can also be configured to allow a driver to send an SMS to a passenger. Typical messages are: "Car is waiting" and "Car is stuck in traffic and will be there as soon as possible".

Another feature allows drivers to change a job before resubmitting it. If the passenger isn't ready the driver can request a delay before the job is re-queued. If there are too many passengers for the vehicle the driver can set the number of passengers so that the job goes to a suitable car. Similarly the driver can also set the job "attributes" so that the right type of vehicle is dispatched e.g. station wagon, wheelchair, etc.

A driver can create a booking – see section 4.4 below.

Other features provided for the drivers are:

1. In-vehicle navigation is provided using mapping data provided by Google Maps. There is no need to update the map data as this is done by Google Maps. Alternatively the navigation can be done using the mapping built into a smartphone. This is done using the SmartDriver app described in section 3.4.

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[2] To prank a phone is to let it ring two or three times as a signal.

[3] A job offer can be accepted on the phone if using the SmartDriver app. See section 3.4.

2.   Lost property can be recorded on the driver's screen. The details are immediately available to the base operator.

3.   A driver can blacklist an address or a passenger. No work for that address/-passenger will be offered to that driver.

4.   Statistics on past and future jobs in each zone can be displayed. These allow a driver to have a feel for the work being done.

5.   Shift restrictions can be enforced automatically so that drivers don't inadvertently breach their legal obligations to take breaks. This applies particularly in New Zealand.

6.   A logbook meeting the New Zealand specifications can be produced on request.

Taken together these features mean that drivers rarely need to talk to a base operator. The use of the 'query channel' is dramatically reduced compared to a conventional dispatching solution. The average is about three calls per hour for each 100 vehicles.

3.2.   SmartMove dispatching algorithm

SmartMove is based on the concept that the server will offer a job to a suitable vehicle. If the driver of the vehicle does not accept the offer then the job will be offered to another driver.

Several methods for dispatching work are supplied with SmartMove. The standard method is based on zones. Zones can be any shape and size and typically will follow natural boundaries – rivers, railway lines, etc. Tools are provided to allow fleets to define their own zones.

Normally there is no bidding for work. An offer may be made whenever a car is vacant – when the fleet is busy the offer will be made as soon as the meter is cleared at the end of a job. Typically drivers are given 15 seconds to accept an offer but, as with everything in SmartMove, this can be changed. The intention is that drivers do not use the terminal whilst driving. As soon as the car becomes vacant the next job is offered if one is available – there is no need for the driver to reserve work in advance.

The dispatching rules are complex but at the simplest level a job will be offered to the car in the same zone that has been waiting longest. If no car is available then SmartMove will search in other zones. The order in which zones are searched is configured separately for each zone. If required, a delay can be specified before the next zone is searched.

If no car can be found in any of the zones listed the job is added to the "cover list" and may be offered to any car. Drivers can specify how far they are prepared to travel and any unallocated job that is within the distance given will be offered automatically to the driver.

When a driver has determined the destination zone from the passenger and the meter is on the driver may "plot" to that zone. If any work is waiting in that zone a vacant car will not be sent to that zone and the work will be offered to the driver as soon as the meter is turned off. If another car becomes vacant in that zone first then the work will be offered to that car instead.

Bidding for work is also provided for fleets that wish to use this method for dispatching. In this case local work is offered in the usual way but more distant work is not. A driver is presented with a list of remote jobs waiting and can bid for any of the jobs listed.

Alternatively jobs can be allocated on the basis of which car is closest. When two cars have almost exactly the same distance to the job – because the cars are on a rank for example – the job is given to the one that has been vacant longest.

3.3. Tracking and mapping

Every car reports its position periodically. If the car is stationary the car reports every minute; if the car is moving the car sends a position every 300 metres (approximately). If there has been a significant change of speed or direction these are also recorded. If the driver has triggered a panic alarm then the data is recorded every five seconds.

This information is available for display on a map which updates regularly. The map updates every 5 seconds if the mouse is moved over the map otherwise the update rate gradually slows to once every minute. The position of every vehicle is shown and colour is used to indicate the state of the vehicle (green=vacant, brown=booked, blue=engaged, etc.).

Clicking on the car number will result in the map being shifted so the car is in the centre of the map. This enables rapid location of a driver in trouble.

The example below shows the taxis operating on the Mornington Peninsula in Victoria. The vehicles regularly traverse an area that is over 100km long with regular trips to Melbourne's Tullamarine airport.

If the vehicle loses coverage the tracking data is stored and transmitted when connection is re-established. This means that the path taken by a vehicle can be reconstructed even if the vehicle was out of coverage for part of the trip.
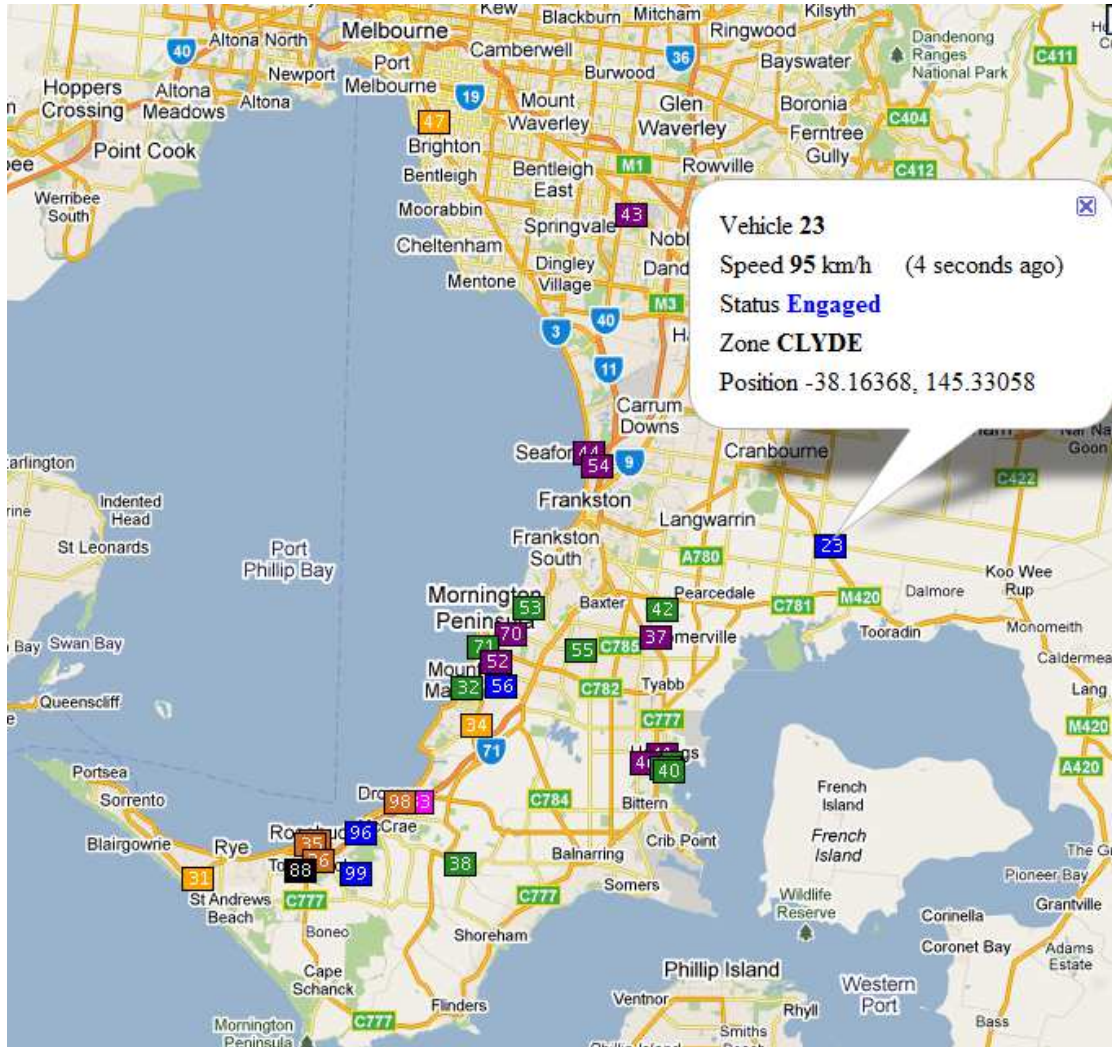
The mapping is based on Google Maps. The operator can zoom in and out, and also pan the map.

It is also possible to overlay a satellite image to see the vehicle's position relative, to the surrounding buildings. An example is shown here.

3.4. SmartDriver app

Drivers may use the SmartDriver app on their smartphones. This app provides a few features that support the driver when out of the car. These are:

1. A job offer can be accepted on the phone. The driver must still go to the car and re-accept the offer in the car but extra time is allowed.

2. The phone can be used for navigation. When the driver requests a map on the MDT the address is sent to the phone and the navigation system built into the phone can be used to get directions.

3. Messages can be read on the phone.

4. The logbook can be requested. This feature is primarily for use in New Zealand.

5. In future the SmartDriver app will be used to manage rosters.
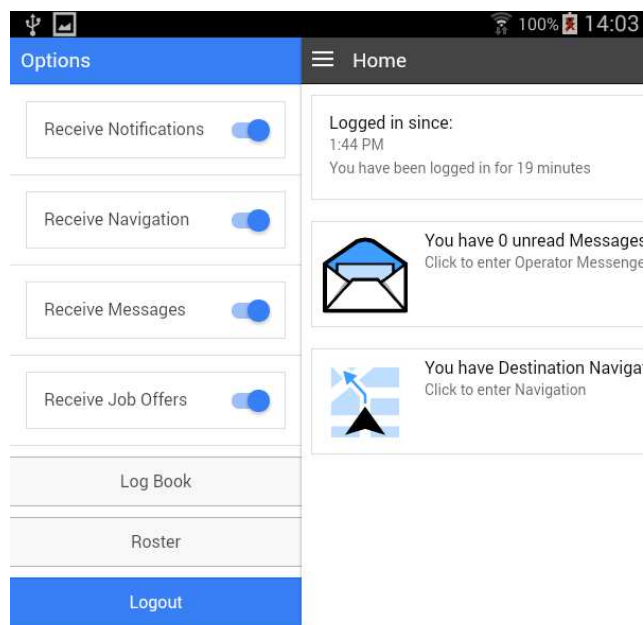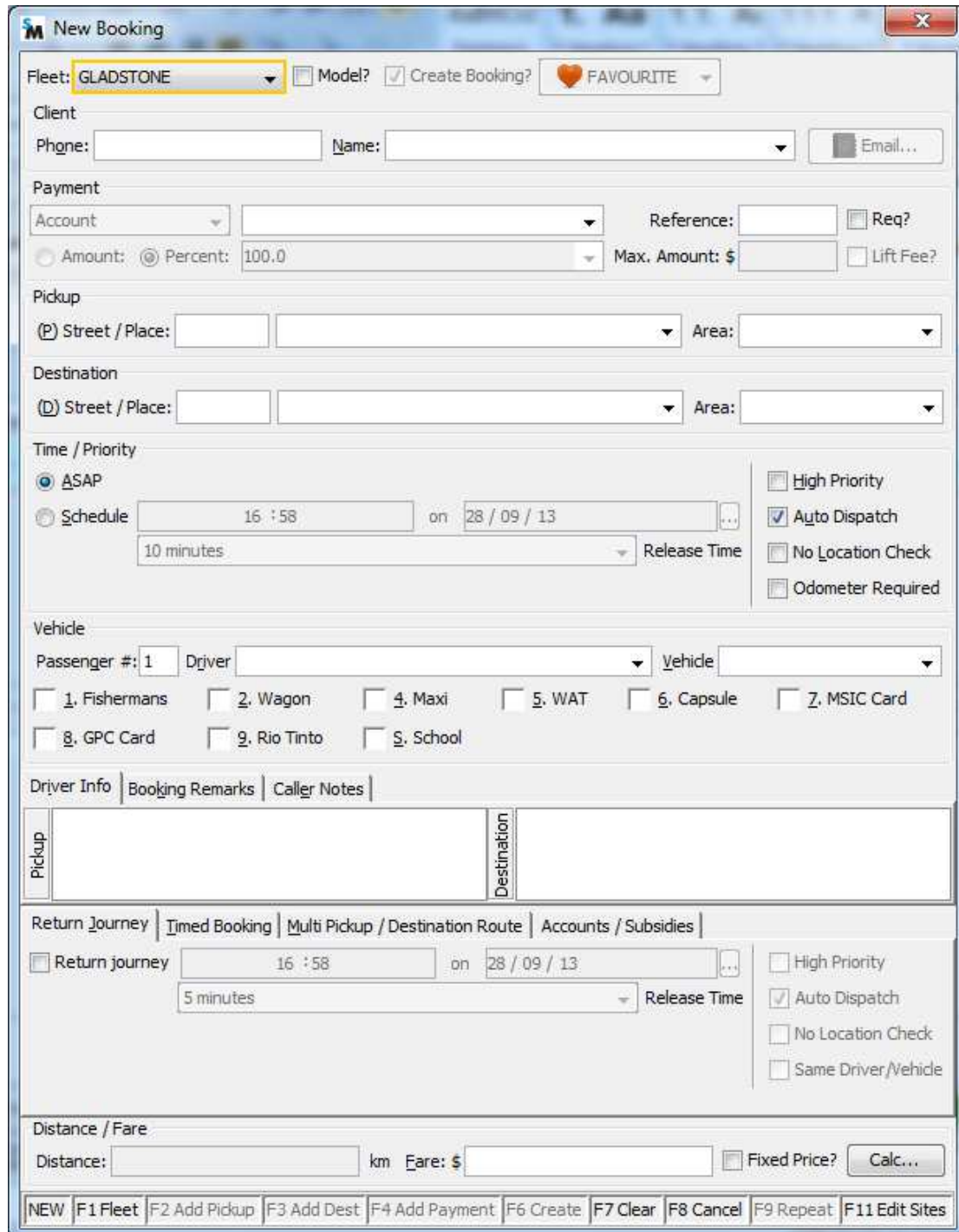
4. SmartMove bookings

SmartMove offers a variety of ways to make bookings to handle different situations. These are described in the following sections.

4.1. Operator bookings

The majority of bookings are done by an operator using software running on a standard office computer.

If SmartMove is connected to the phone system and the caller's phone number is available then SmartMove provides a number of features to help the booking process. As soon as the call is answered a "pop-up" screen appears – an example is shown below.

This screen lists addresses commonly used by the caller. With a single keystroke the booking form can be filled with the details for the selected address. In addition various other fields can be set for the caller and these are included in the booking automatically. This allows standard preferences to be set for the caller – the need for a wheelchair, for example. An email confirmation can be sent if required.

Apart from addresses the pop-up screen also lists model (template) bookings for the caller. These are used when a caller has complex booking requirements. Pre-bookings, current bookings and bookings from the recent past are also listed. All of these bookings can be retrieved with a single keystroke.

SmartMove is delivered with a set of street names and new street names/place names can be added whenever required. No setup time is required. A proprietary algorithm refines the location as each new pick-up occurs so if a location changes – a nightclub moves to a new address for example – the system will learn the new location.

An estimate of the fare can be obtained by using the *Calc* button on the booking form. The estimate is based on the route recommended by Google Maps and one can change the route to get a new estimate for the distance to be travelled.

Multiple pick-up/drop-off addresses are handled on the booking form and with the fare calculation.

When a job is on account and or paid by some sort of subsidy the details can be entered on the booking form and passed to the driver. More details are given in section 5 below. Payment by credit card is also possible if the fleet has registered for credit card payments
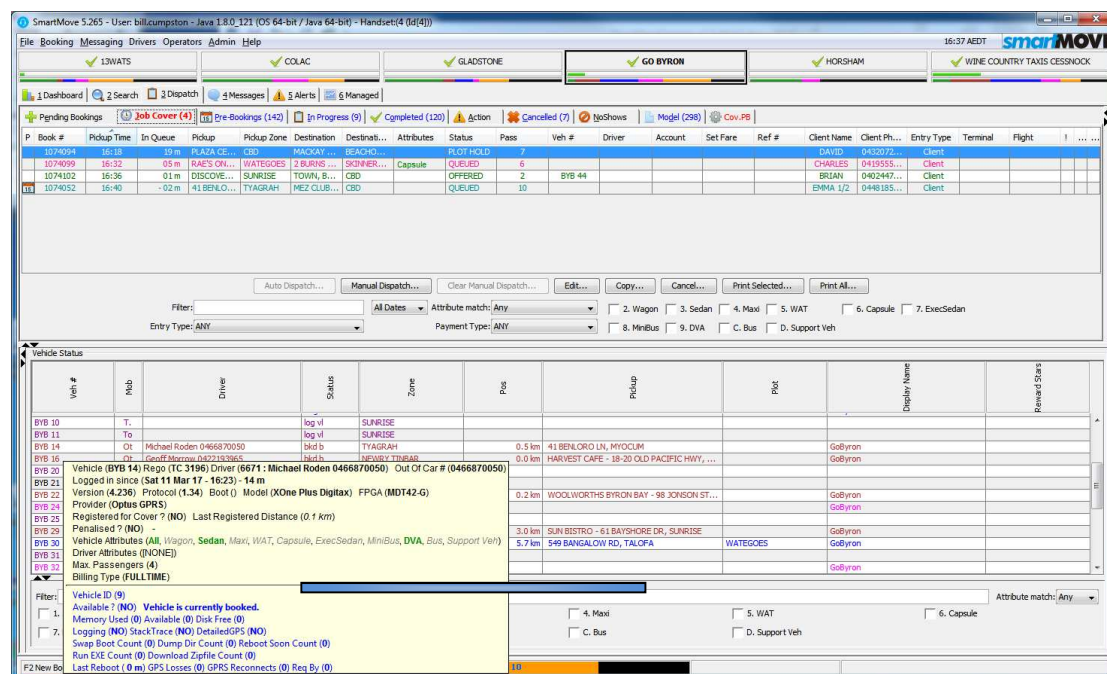
Bookings for a period of time can be handled. A separate screen can be used to manage important bookings – see section 4.9.

Two additional features help with the booking process:

- Blacklist entries can be created for drivers and for passengers. A driver may refuse to go to an address or a passenger may request that a particular driver not be sent.
- Additional information may be recorded for an address. These are known as "booking qualifiers" and may be a note for the operator, a note for the driver, or the addition of an attribute. For example, any vehicle going to a particular address may need to be capable of carrying a wheelchair. The wheelchair attribute can be added automatically.

Apart from the booking form, the base operators have access to a dispatch screen which shows the current status of the fleet.

In this example the waiting jobs are shown in the top section and the status of each vehicle is shown in the bottom section. "Flyovers" are used to provide additional information about a particular car.

4.2. Automated bookings

The companion SmartVOIX phone system described in section 7.4 below provides a sophisticated system for handling bookings automatically. A caller is offered a number of addresses[4] – these are the ones most commonly used by the caller. After selecting one of the addresses the caller can specify the number of passengers and, if required, the date and time can be entered. At any time the caller can join the queue to speak to an operator.

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[4] Typically four addresses are offered but the number is configurable.

Typically about one third of bookings are handled automatically by SmartVOIX. In some fleets almost 50% of bookings resulting from calls are handled automatically using this service.

In addition it is possible to create a booking for a caller at a preset address. This is intended for fleets that have a phone system that already offers that option.

4.3. Recurring (repeat) booking

A sophisticated system for handling recurring bookings is provided. First a model booking is created and this booking is copied whenever a new booking is created. Any change to the model booking will automatically be incorporated in future bookings.

The second step is to define when the booking is to be generated. There are two main options:

1.   A booking can be produced on specified days on a weekly or fortnightly schedule. Thus one can have a booking on Monday and Wednesday each week or every second Thursday.

2.   Instead of a schedule one can have a "diary" and specify precisely which days require a booking.

Diaries can also be used as a "filter" for bookings done on a schedule. The filter can be used to include or exclude particular days. One diary is for public holidays so one can have a booking for every Monday and Wednesday each week *except if the day is a public holiday*. Similarly one might have a booking for every weekday that is in the school-term diary or have a booking for every weekday that is not in the school-holiday diary.

4.4. Driver bookings

The driver can create a booking without calling the base operator. Options that can be set include the pickup address, the destination address, the number of passengers, the time the taxi is required (which may be "now"), any special job attributes (e.g. wheelchair vehicle required), and notes for the driver. This feature is useful in several scenarios:

•   When a driver has picked up and other people are waiting. This might apply at a bus terminal.

•   When a passenger is being dropped off and asks to be picked up sometime later.

•   When a driver drives past a person trying to hail a taxi.

•   When the driver wants to enter a private job in order to use DocketKiller – see section 5.

4.5. Internet bookings using ExpressBooker

ExpressBooker is a system that allows clients to book a vehicle over the internet. It can be used in one of two ways:
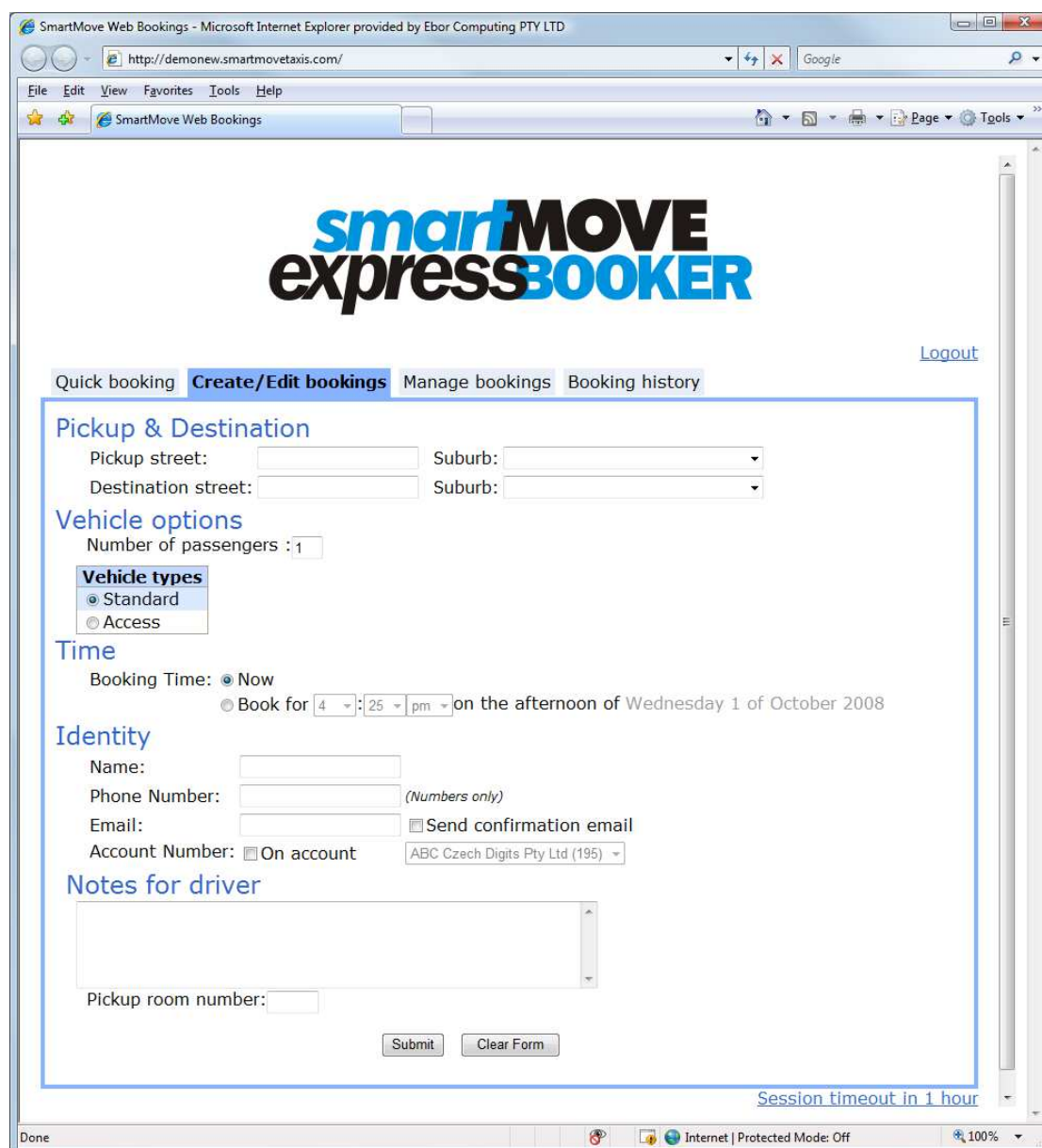
•   Registered users can make and change or cancel their own bookings.

•   Non-registered users can make bookings but need to call the base to make changes to the booking.

The booking form is similar to that used by the base operator but with some special features:

- For pre-bookings the date is shown very clearly to make sure the client is booking the vehicle for the right date and time.

- Work can be put on account if there is an account number linked to that user. A user may be linked to more than one account.

- An e-mail confirmation may be requested.

- Only known addresses can be entered. Internet users cannot enter a name that is not already in the system.

Once a web booking has been made it is treated in the same way as bookings made by the base operator.

4.6. Internet bookings using own website

Fleets with their own website can embed a SmartMove "widget" on the website to create bookings.

An example can be seen at *tareetaxis.com.au* – the fleet has developed the website but the booking form has been supplied by SmartMove.

The bookings go directly into the SmartMove job queue.

4.7. SmartHail – smartphone bookings

The SmartHail phone "app" may be used for making bookings. It allows a passenger to book a taxi and monitor the progress of the job. If preferred the booking can be made using the phone's position.

If more than one fleet services the address then the passengers is asked to choose the fleet to receive the booking. If a fleet gets a "branded" version of the SmartHail app then all bookings made with that app will go to only the fleet.

If the fleet has registered for credit card payments then passengers can pay for the trip with their app. See section 5.8 for more details.
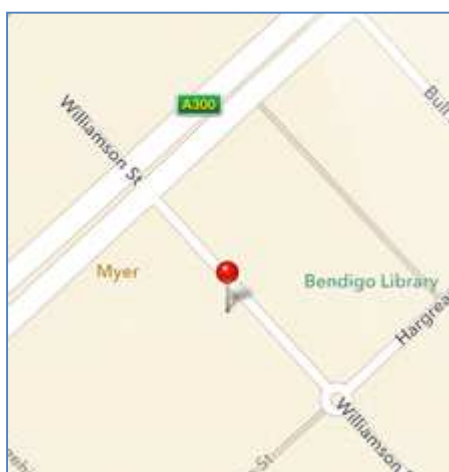
4.8. QuickCab and push button systems

There are several methods for creating an immediate booking. These are intended to be used in places where there is a high level of demand for taxis as soon as possible.

SmartMove offers the QuickCab app which can be used on an iPhone/iPad or on an Android device. A method for simply booking a vehicle using an iPad is also available.

Other third-party products can be used with SmartMove. Shown here are Taxi Butler[5] and bttn[6].

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[5] Taxi Butler: See https://www.taxibutler.com/

[6] bttn: See https://bt.tn/

4.9. Managed bookings

Some bookings require a higher level of control and the *managed* page in the booking software provides that fine control. It shows the unallocated jobs that are waiting and the jobs that have been pre-allocated to cars.
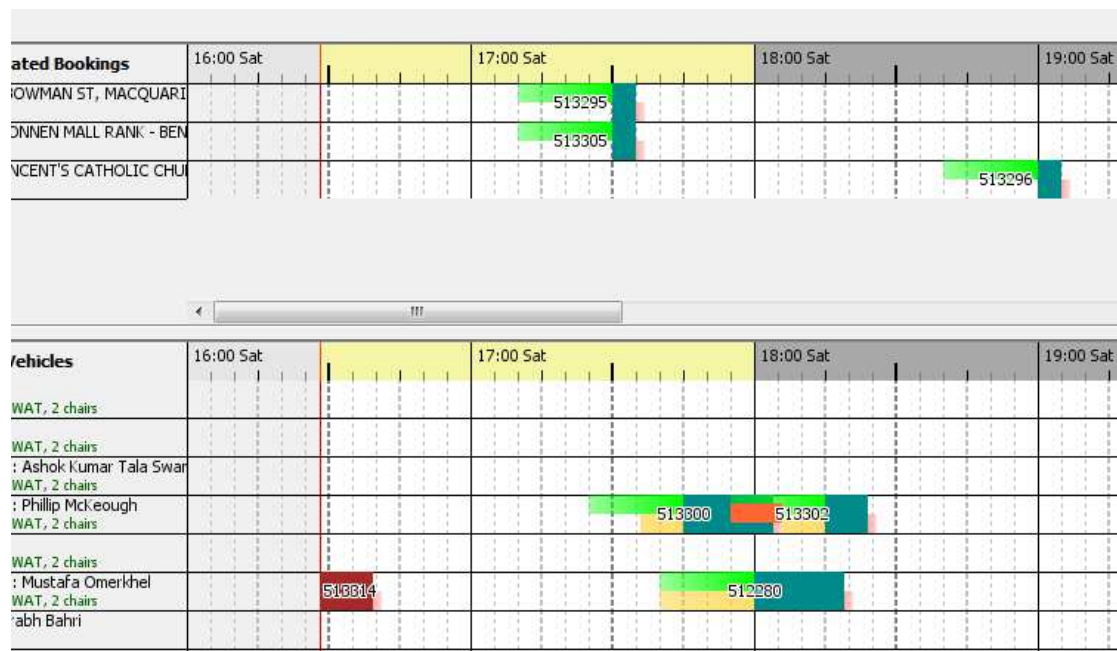
In this example the unallocated work is at the top and the allocated work is at the bottom. A job can be allocated to a car by "dragging" it to the car. Similarly a job can be dragged to a different car or moved to the unallocated list. If there is an overlap it is shown in red – seen above with jobs 513300 and 513302.

This display is particularly useful for VIP bookings and wheelchair bookings. However it can be used for any situation where careful management of the bookings is required.

COMMERCIAL-IN-CONFIDENCE

5. SmartMove bookkeeping ('DocketKiller')

SmartMove is not just a dispatching system. It also handles the bulk of the bookkeeping associated with handling accounts and managing vehicles. This component of SmartMove is referred to as DocketKiller.

5.1. Recording fare and payment details

The key concept is that the bookkeeping can be greatly simplified if drivers record details of payment electronically when each job is completed.

The first step is to determine the amount to be paid. Normally the fare is read directly from the vehicle meter and the driver can skip this step.

The second step is to record how the fare was paid. The choices are: cash, credit card, subsidy scheme or account. In the example below the driver has indicated that half the fare (50%) is paid by subsidy and the remaining $7.00 has been paid by cash. Work can be put on account and multiple accounts may be used if required. Lift fees can be claimed when appropriate. Mistakes can be corrected if necessary.

Another option is to allow the passenger to pay with the booking app or a pre-registered credit card – see section 5.8.

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The third step is to press the "Done" button when the "To pay" amount is zero.

5.2. Generating customer invoices

Once account work is recorded in SmartMove producing invoices to customers is easy. Simply specify the period of interest and ask SmartMove to produce the invoices. An invoice can be sent by e-mail to the account holder.

An example is given in section 10.6 below.

5.3. Generating invoices from owners to fleet

If work is done on account the owners of the vehicles expect to be paid for the work. This is normally done by generating invoices to the fleet from the owners.

An example is given in section 10.7 below.

5.4. End-of-shift report

The end-of-shift report lists all the work done in a vehicle by a driver. It lists the jobs, the fares, provides a reconciliation of the cash, and calculates the income for the bailor (owner) and the bailee (driver). The end-of-shift report is particularly useful when the vehicle is not driven by the owner; in particular it is useful for fleet-owned vehicles or for groups of vehicles managed by a depot.

This report is useful only if all fares are recorded. An example is given in section 10.8 below.

5.5. Bailment invoice

The bailment report is a summary of the shift reports over a period of time.

5.6. DocketKiller Options

As there is some sensitivity to collecting fare information in the vehicles, SmartMove provides some flexibility over when fare information must be entered. The typical options are:

- The fleet might mandate that all account work must be recorded in the cars. This is to reduce the effort required to produce invoices to account holders.

- The fleet might also mandate that all work must be recorded in fleet owned cars, irrespective of who is driving.

- An owner might mandate that all work done by other drivers of the vehicle must be recorded. This will allow the end-of-shift report to be used.

- An owner driver might not want to record every job and has the option not to do so. In this case the owner will not be able to use the end-of-shift report to accurately record income earned. The fleet can still mandate that account work be recorded.

5.7. Data export

Whilst SmartMove helps with the bookkeeping functions it is not an accounting system. The totals of the various invoices can be exported to a text file suitable for importing into Excel or an accounting package such as MYOB or QuickBooks.

5.8. Credit card payments

SmartMove provides two methods for billing a credit card at the end of a trip. These methods are available only if the fleet has registered for credit card payments through Stripe.

The main benefits for processing credit cards through SmartMove are:

• Drivers do not handle credit cards.

• Details of the payment are recorded with the booking and the payment is handled in the same way as other work on account.

• The fleet receives any surplus from the surcharge after fees are deducted.

Note that the card details are held by the payment provider *Stripe*. Neither the fleet nor SmartMove hold any card details

5.8.1. Operator booking

The first method applies to operator bookings.
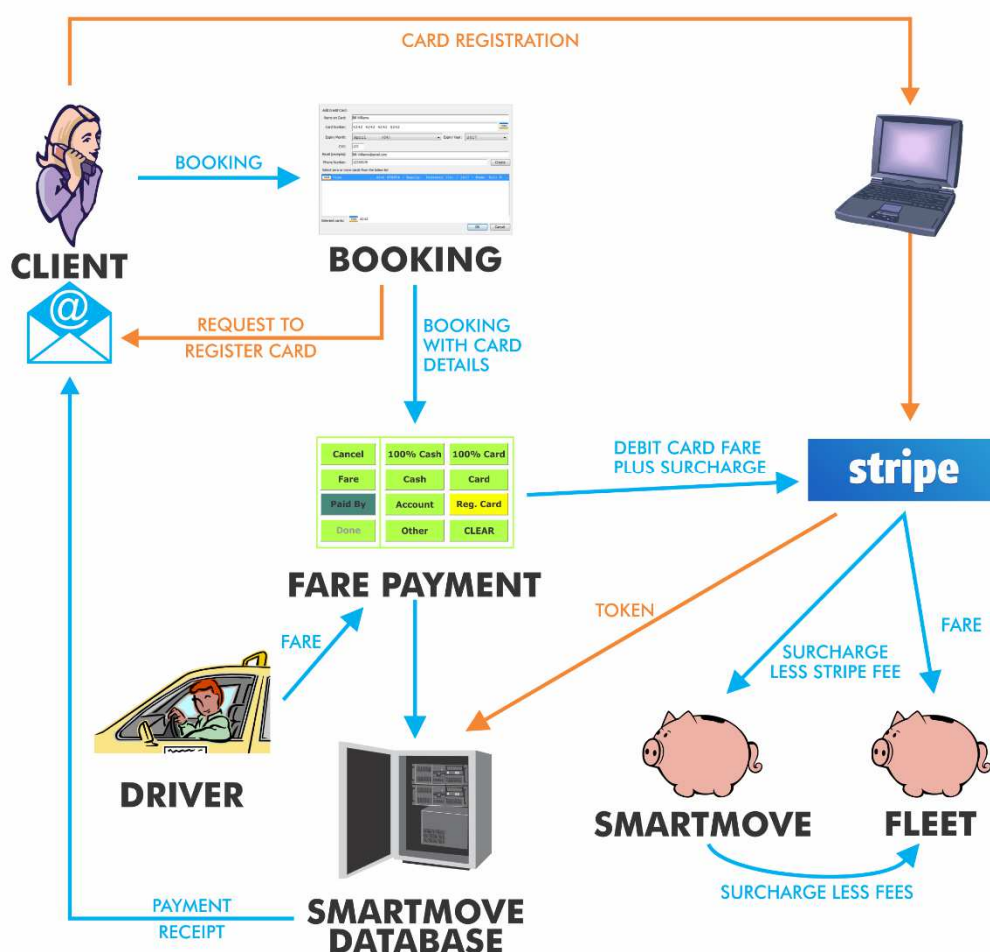
The steps involved are:

• The passenger indicates to the operator that payment by credit card is required. When the passenger's email address is entered in the booking the passenger is

sent an e-mail asking for the credit card number. Note that the passenger enters the number but neither SmartMove nor the fleet ever see the number.
This process is done once only.

- At the end of the trip the driver is able to bill the card provided the passenger supplies the last four digits of the card.
- Payment is made directly to the fleet and is treated like any other work on account.

Protection from fraud is provided in two ways:

- The operator and driver would have to collude to debit a card without authorisation
- All money is paid to the fleet so there is little benefit for the driver or the operator.

5.8.2. App bookings

The second method applies for bookings made with the SmartHail app (or branded equivalent) – see section 4.7
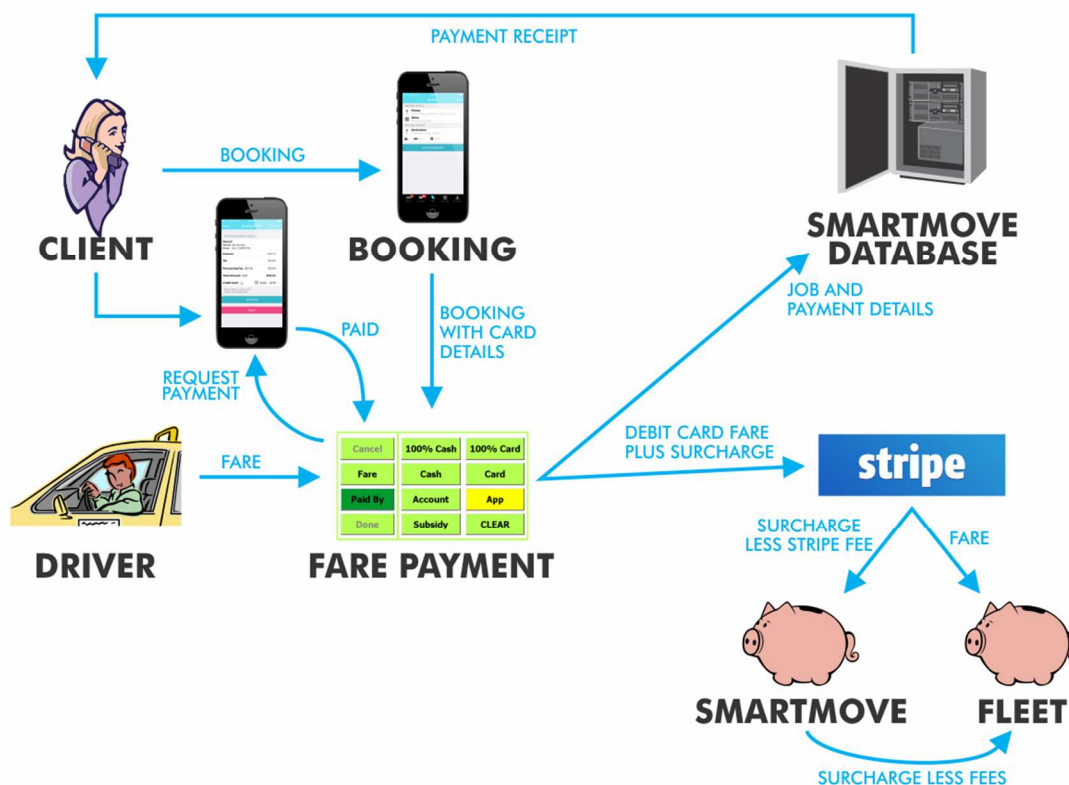
The steps involved are:

- The passenger must enter the credit card details in the app.
- At the end of the trip the driver can request payment from the app. At this point the passenger needs to approve the debit on the phone.
- The fare is paid to the fleet and an e-mail receipt is sent to the passenger.
- Payment is made directly to the fleet and is treated like any other work on account.

6. SmartMove fleet management and reporting

The higher data bandwidth available from using GPRS means that a large amount of information can be collected and recorded. The position of every car is recorded along with every significant event. The data can be held indefinitely and the opportunities for analyzing this data are almost endless. Reports can be produced for the police, the regulator, the fleet manager, owners, and drivers.

Virtually all management functions are done using a web browser. Users are added, options are set, recurring bookings are defined, various invoices and reports are produced, etc. A fine degree of control over access rights is provided so that individual users can be given access to specific areas.

The image below shows part of the home page for the fleet management website and the menu available. Some examples of the reports that can be generated are given in section 10 below.

Owners and depot managers can be given access to some of the reports limited to their own cars.

7. Equipment

7.1. Vehicle hardware

The equipment in the vehicle consists of the following:

Components:	
1x screen and computer. This is normally mounted near the pillar next to the driver. Often referred to as the MDT = mobile data terminal.	
A combined GPS (Global Positioning System) and GPRS antenna. This is normally left on the dashboard or attached to the windscreen.	
1x Panic Switch. This is normally fitted near the steering wheel column.	
1x Meter Listening Cable + adaptor. Used to connect to the meter.	
A cable loom. Wires connect to the battery, the panic button, the meter, and the ignition power line.	

Spares are provided and faulty units are simply replaced.

7.2. Base setup

The operators use standard desktop computers. An operator solely doing bookings could use a single screen computer but an operator overseeing the dispatching would find it more convenient to have at least two and possibly three-screens. It is recommended that computers have at least 8GBy and at least one large monitor (27 inches or more).
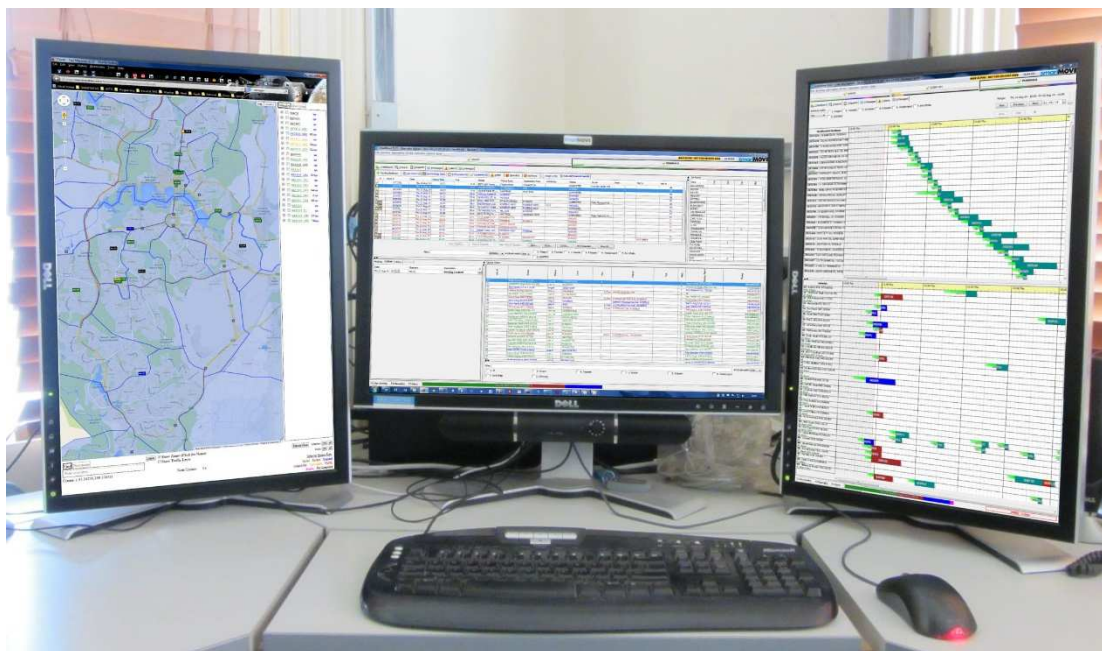
All workstations must be connected to a broadband internet link. This is done with a conventional office network. If possible two internet connections from different providers should be available in case one of the providers fails.

Most small to medium sized fleets can manage with a laptop computer with a wireless internet "dongle" when there is a power failure.

A printer is required for reports – see sections 6 and 10. A networked duplex colour printer is recommended. It is recommended that each desk be equipment with a least two network outlets and at least four power outlets. A guide to setting up a call-centre is available.

7.3. Phone interface and screen pops

If the caller's phone number (callerid) is available SmartMove will display information when a call from that caller is answered. The "screen pop" will include addresses commonly used by that caller and some bookings linked to that caller. See section 4.1 for more details. In addition, for operators that take bookings from more than one fleet, the booking form for the correct fleet is displayed. This can be done for any phone system that provides a TAPI[7] interface.

7.4. SmartVOIX Phone System

SmartVOIX is offered as a separate product. Features offered with SmartVOIX that are not available with the TAPI interface are:

- Automated bookings. Two options are available. In the simplest form the caller is invited to "press 1 if you are ready to travel now". This uses an address assigned to that phone number. The more sophisticated form invites the user to select from a short list of addresses commonly used by that caller – the first four addresses that are displayed to the operator. Thus the caller might hear "press 1 for a standard car at Bentleys Aged Care, Harpin Street now, press 2 for a car at Bridge St Med, Bridge St", etc.

- Calls are recorded and linked to bookings. The operator can rapidly replay the call(s) linked to any booking.

- Calls can be directed to another SmartVOIX system. This allows one call centre to hand over to another one whenever required without paying a redirection fee.

- Calls can be taken anywhere on the internet. This allows operators to work from home.

- Some control over the ordering of calls is provided.

SmartVOIX is a Voice-over-IP (VoIP) system based on SIP technology. It can be connected to regular analogue lines (PSTN) or ISDN lines using a separate interface box.

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[7] TAPI = Telephone Application Program Interface. This lets SmartMove connect to the phone system so that it gets the callerid whenever a call is answered. Normally the information provided is the callerid and the incoming line – the incoming line identifies which fleet has been called.

8. Maintenance

8.1. In-vehicle equipment

The lease arrangement normally used for SmartMove covers all maintenance costs. Maintenance of in-vehicle equipment is by replacement – spares are held by the fleet and any faulty units are simply replaced. This takes only a few minutes and is normally done by either an auto-electrician or by someone connected with the fleet. Anyone competent in handling electronic equipment can do the task. A website is provided for reporting that a unit is being returned and a replacement is dispatched the next working day.

8.2. Software updates

The software in the vehicles is updated remotely. The software is downloaded while the car is operating but the unit must be restarted for the new software to be installed. This is normally done remotely when the car is not operating – i.e. when no driver is logged in – or it happens by default when a driver turns the unit on at the start of a shift.

In the base, when the booking software is started – normally at the start of an operator's shift – the computer will automatically check for an update. If one is available it will be downloaded automatically before the booking software is started. This process takes less than a minute.

All the fleet management services are provided using a standard internet browser. If the software is updated then users will automatically get the new version next time they use the page.

8.3. Support

A 24 hour support line is provided for resolving urgent operational issues. Non-urgent issues are normally handled using e-mail.

Remote desktop technology is used if an operator wants to demonstrate something to SmartMove staff. This allows SmartMove staff to see what is on the operator's computer and take control if necessary. Note that this is control is available only when started by the base operator – SmartMove staff do not normally have access to the fleet's workstations.

The vehicles keep a log of recent events that can be downloaded and investigated if necessary. Similarly the booking software also keeps logs – the operator can request that the logs be sent to SmartMove so that SmartMove staff can investigate a problem.

Some serious faults trigger an e-mail to SmartMove. In the rare cases that this happens the fault can be investigated as soon as it occurs.

8.4. Daylight saving changes

The software automatically adjusts for daylight saving.

9. Company details

SmartMove is owned and marketed by the Australian company CellTrack Systems Pty Ltd. All development is done by the sister company Ebor Computing Pty Ltd. Ebor Computing has been in operation for almost 30 years and much of its work involves research and development of new ideas. Both companies are 100% owned by the Managing Director.

Details for both companies are given below.

Company name	CellTrack Systems Pty Ltd	Ebor Computing Pty Ltd
Address	147 Henley Beach Road Mile End South Australia 5031	
Australian Business Number	75 110 064 036	39 060 253 394
Phone	+61 8 8238 3075 NZ only: 09 281 3536	+61 8 8238 0300
Fax	+61 8 8238 3004	+61 8 8238 0304
Managing Director	Bill Cumpston	
Email	Bill.Cumpston@smartmovetaxis.com	
Web	www.smartmovetaxis.com	www.ebor.com

In New Zealand CellTrack Systems operates as SmartMove Systems Ltd.

The entire SmartMove system can be demonstrated over the internet to anyone with access to a web browser (Internet Explorer or equivalent).

10. Sample reports

It is not possible to describe all the functions on the fleet management website in this document but examples of some of the reports that can be produced are show in the following sections.

One unusual feature of SmartMove is that performance reports are based on the time at which the taxi arrived at the pick-up location, not the time when the meter was turned on. This means that reports are not affected by the late arrival of a passenger.

The reports included are:

Section Page	Report	Description
10.1 p41-	Booking Details	The Booking Details Report gives a complete history of a booking. Details include • Booking details (who, when, operator, etc.). • Pick-up/destination details. • Fare payments details. • Significant events. • Map showing route taken to pick-up point (brown line) and route taken when engaged (blue line). This report is useful for investigating complaints and for responding to police queries.
10.2 p43	Job Totals	This report gives a summary of bookings taken over a period of time.
10.3 p44	Response Time Report	This report gives a variety of booking statistics. The first page of this report gives various totals and the second page presents the information in graphical form – the last graph compares the response times for wheelchair (access) and non-wheelchair bookings. In this example the red line (pre-booked non-access) shows that 50% of pre-booked jobs are started on or before the time requested. This report was written to conform to a particular reporting requirement in Victoria. Similar reports are available for other agencies and new reports are produced when reporting requirements change.

Section Page	Report	Description
10.4 p45	Taxi Availability Report	The Taxi Availability Report shows the periods when a taxi is available for work. It also shows when the driver has rejected a job offer. The report was written primarily to ensure that vehicles are available for work when they should be.
10.5 p46	Find Vehicle Report	The Find Vehicle Report is used when trying to determine which vehicle(s) were near an address at a particular time. It is often used in response to a query from the Police. The example here shows that vehicle SH4 visited the address entered. Two addresses may be entered; this is normally used to find the vehicle that did a particular job. For example a lady may call so say she left her purse on a vehicle that picked her up at the shopping centre and took her home.
DocketKiller Reports		
10.6 p47	Account holder invoice	Invoice from the fleet to an account holder listing the work done by the fleet for that account holder over some period of time. In this example a 5% account keeping fee has been added.
10.7 p48	Operator Invoice	Many fleets need to pay the vehicle owners for work done on account. This example shows the recipient-created invoice showing the work done by a vehicle.
10.8 p49-	End-of-shift report	Summaries the income earned by a driver on a shift.

10.1. Sample Booking Details Report

Booking Details

Select a Fleet : Swan Hill Taxis

Booking Number : 395056

[Search]

- Booking Details

Booking Number : 395056
Booking Type : DISPATCH_CLIENT
Created By : Lisa Trott (2802 / 29) at 2013-04-27 07:46:37
Requested Time : ASAP
Booking Priority : NORMAL
Booked Account : ()
Booked Travel : 2.65 km (Estimated by GPS)
Engaged Travel : 2.44 km (Estimated by GPS)
No Location Dispatch : Yes

- Current Attributes

Specified Driver : ROBYN JOLLEY (553152)

- First Address Edit Address

Pickup : LAZY RIVER MOTEL, SWAN HILL
Passengers : 1
Contact :
Zone : OUTER NORTH

- Final Address Edit Address

Destination : RAILWAY STATION SWAN HILL, SWAN HILL
Zone : CBD

- Booking Payment Details Edit Payment

$7.90 : Fare
$2.10 : Extras
$10.00 : TOTAL
$10.00 : Paid by Cash

+ Click to Show Speeds and Locations Table

- Booking History and Updates

2013-04-27 07:46:37 : Booking Created by Lisa Trott (2802 / 29)
2013-04-27 07:46:37 : Lisa Trott (2802 / 29): Booking Created - Existing Client
2013-04-27 07:46:37 : Lisa Trott (2802 / 29): Booking Created -
2013-04-27 07:46:37 : Offer (439378) was made to driver Shirley Croft (118585 / 406) of SH7 WAT 10 (C5107) in zone OUTER NORTH - Reason: Same Zone -
2013-04-27 07:47:16 : Swan Hill Dispatch (swanhill / 401): Booking Updated - Turned **ON No-Location-Dispatch**.
2013-04-27 07:47:16 : Swan Hill Dispatch (swanhill / 401): Booking Updated - Driver **ROBYN JOLLEY** Added
2013-04-27 07:47:17 : Offer (439379) was made to driver ROBYN JOLLEY (553152 / 107102) of SH3 (C0344) in zone CBD - Reason: Driver Requested
2013-04-27 07:47:24 : Driver ROBYN JOLLEY (553152 / 107102) accepted the offer (439379) and was sent the job (396615)
2013-04-27 07:52:32 : Message 21691 sent by operator Lisa Trott (2802 / 29) to driver ROBYN JOLLEY (553152 / 107102) - 'SHE IS IN ROOM 35 '
2013-04-27 07:53:50 : Message 21691 read by driver ROBYN JOLLEY (553152 / 107102)
2013-04-27 07:56:39 : Driver ROBYN JOLLEY (553152 / 107102) arrived at the pickup location
2013-04-27 07:59:21 : Driver ROBYN JOLLEY (553152 / 107102) of SH3 (C0344) started the job (396615)
2013-04-27 07:59:23 : Vehicle SH3 (C0344) - Plot: CBD
2013-04-27 08:03:21 : Driver ROBYN JOLLEY (553152 / 107102) completed the job (396615) (fare total $10.00)
2013-04-27 08:03:23 : Vehicle SH3 (C0344) - Plot Clear - Job Completed
2013-04-27 08:03:26 : Vehicle SH3 (C0344) - Plot Clear
2013-04-27 08:04:14 : Vehicle SH3 (C0344) - Fare Details: 395056

COMMERCIAL-IN-CONFIDENCE
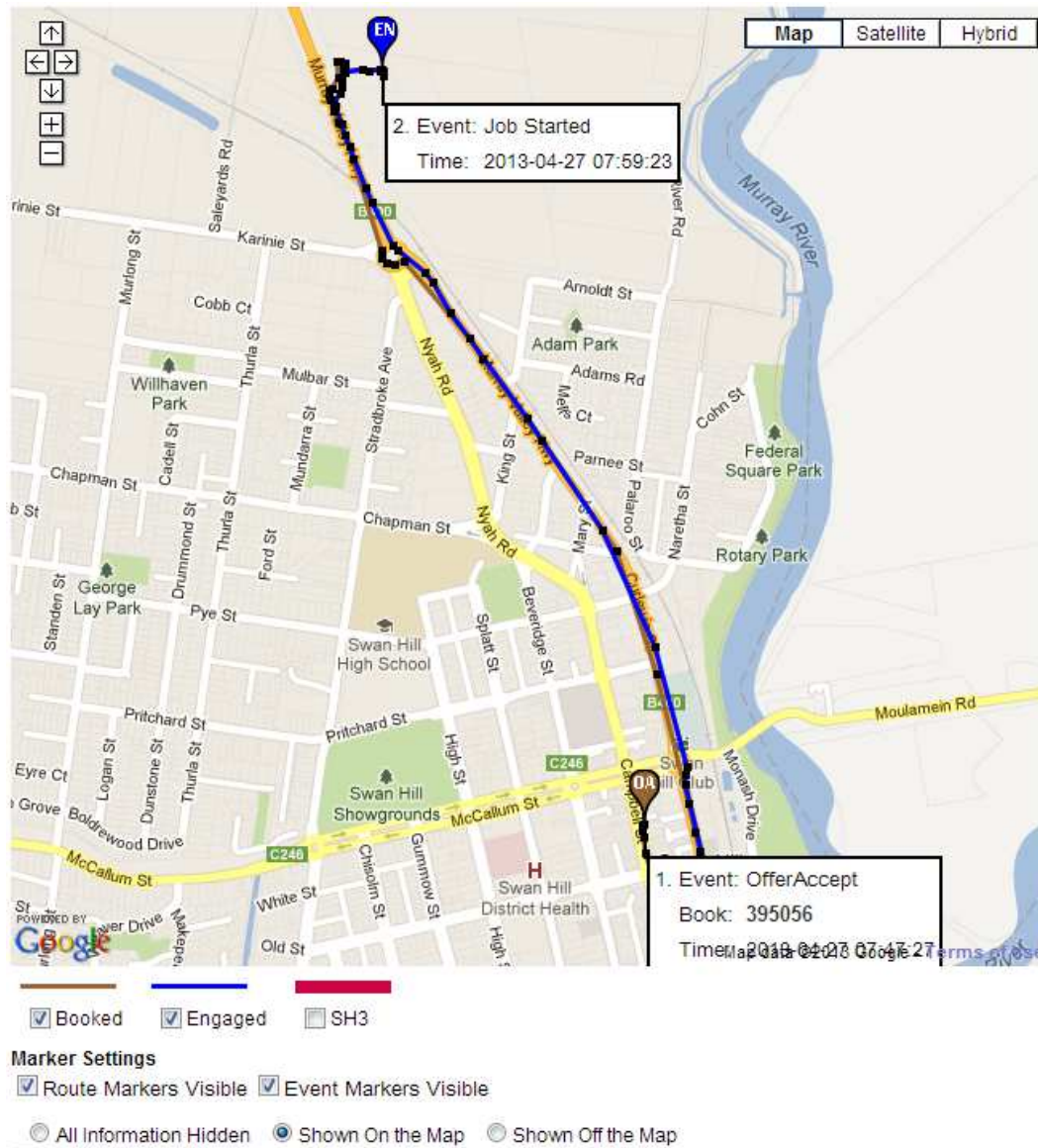
10.2. Sample Job Totals Report

Job Totals

Fleet for Report : Gladstone

Start Time : 2013-04-20 00:00 HH:MM

End Time : 2013-04-27 00:00 HH:MM

○ No Breakdown of Totals
○ Breakdown Totals by Operator
○ Breakdown Totals by Location
○ Breakdown Totals by Driver
● Breakdown Totals by Vehicle
○ Breakdown Totals by Booking Attribute (note that bookings can have multiple attributes)
○ Breakdown Totals by Hourly Totals

Generate Report

Job Totals for Gladstone	CANCELLE	HAIL	NOSHOW	COMPLETE	TOTAL
CANCELLED	383	0	0	0	383
G 7)	0	68	18	157	243
G 6)	0	46	14	256	316
G 3)	0	55	22	230	307
G 4)	0	60	25	181	266
SU	0	31	13	85	129
G 2)	0	42	21	215	278
G 3)	0	39	13	199	251
G 3)	0	44	9	153	206
G 7)	0	30	7	76	113
G 6)	0	17	20	218	255
G 0)	0	38	28	189	255
G 5)	0	49	11	225	285
G 2)	0	35	24	188	247
Te	0	2	0	5	7
G 9)	0	88	20	205	313
G 8)	0	34	32	202	268
G 0)	0	54	21	219	294
G 1)	0	92	29	239	360
G 14)	0	60	24	193	277
G 6)	0	93	34	217	344
G 5)	0	69	34	215	318
G 0)	0	45	22	148	215
G 6)	0	46	9	203	258
G 13)	0	41	17	170	228
G ( )	0	68	30	150	248

10.3. Sample Response Time Report
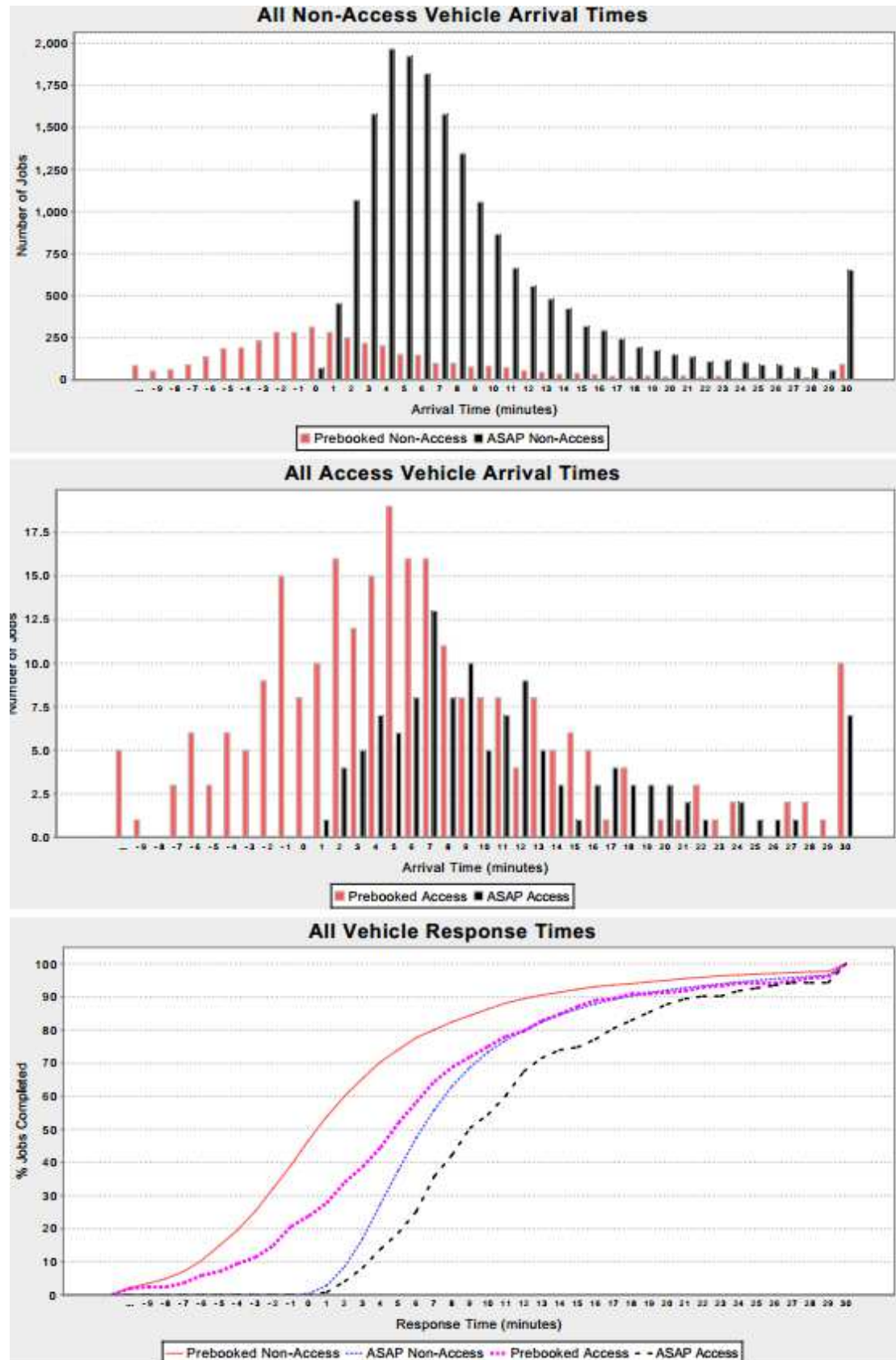
10.4. Sample Availability Report
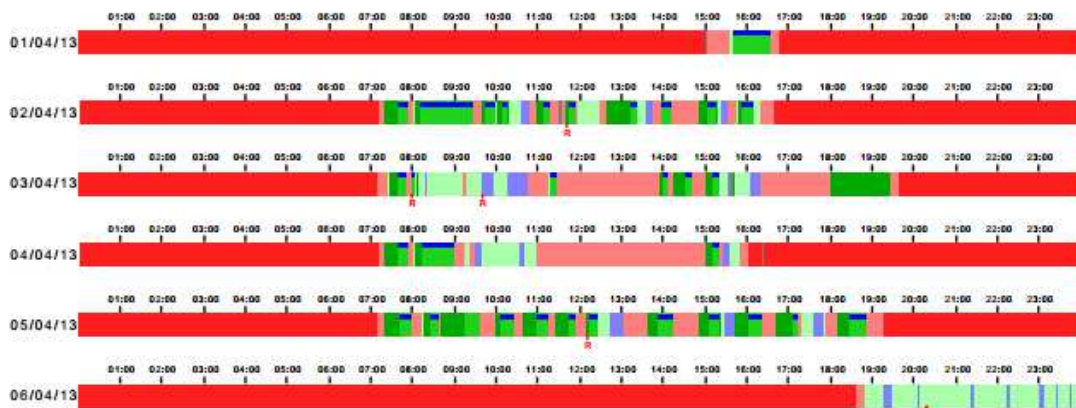
10.5. Sample Find Vehicle Report
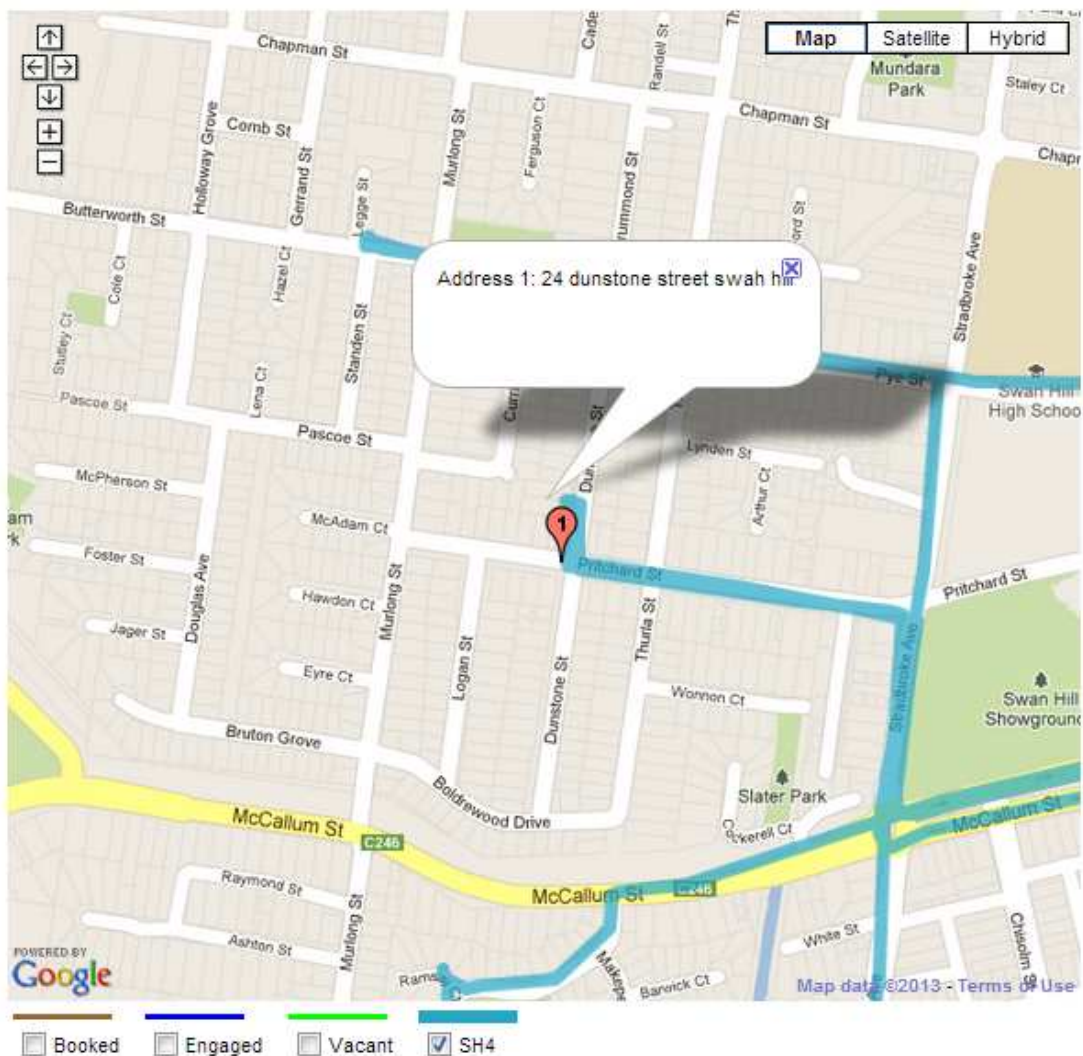
10.6. Sample Account Invoice

Associated Taxis Incorporated
12 Lewis Street
Geraldton WA 6530
ABN: 67 338 077 418
Bookings: 131008 or 08 99213800
Office: 08-99218600
Fax: (08) 9921 3812
Email: geraldtontaxis@gmail .com

PUBLIC TRANSPORT-TRANSWA

PO Box 8125
Perth Business Ctr PERTH WA 6849

Tax Invoice 1/03/13 to 31/03/13

Total (inc GST): **$102.79**
Includes GST of: $9.34
Invoice Number: 3008_130427

	Date Job #	Book Time	Pickup Time	Ref # Client Name	Addresses	Amount (inc GST)
1	7/03/13 1173353	17:43 GER10	17:48	3008	From: TRANS WA DEPOT - PLACE RD, STRATHALBYN	$15.75
2	14/03/13 1176216	18:00 GER05	18:03	3008 / K72008	From: TRANS WA DEPOT - PLACE RD, STRATHALBYN	$17.00
3	21/03/13 1179397	17:53 GER02	18:04	3008	From: TRANS WA DEPOT - PLACE RD, STRATHALBYN	$16.00
4	22/03/13 1179400	09:25 GER12	09:29	3008	From: OCEAN CENTRE - CATHEDRAL AVE, GERALDTON	$15.85
5	27/03/13 1182065	16:13 GER05	16:27	3008 / K78940	From: TRANS WA DEPOT - PLACE RD, STRATHALBYN	$18.85
6	28/03/13 1182298	09:36 GER09	09:42	3008 / 78940	From: OCEAN CENTRE - CATHEDRAL AVE, GERALDTON	$14.45
	Account Keeping Fee					$4.89

TERMS: 7 DAYS FROM INVOICE DATE

10.7. Sample Operator's Invoice

Operator: Premier Taxis Karratha
Vehicle ID: KAR 4
Registration: CT 338
Operator ABN: 86961521404
0891 444 253

Payment for Account Work
Karratha
2 Truslove Way
Karratha WA 6714
86 961 521 404
86961521404

Recipient Created Tax Invoice 1/03/13 to 31/03/13

Total (inc GST): **$1,912.45**
Includes GST of: $173.86

	Job #	Date	Driver	Reference	Account Name	Fare Total	Paid on Account
1	129500	1/03/13		2038819	11253 - Qantas Airways Ltd	$40.65	$40.65
2	129865	5/03/13		2038819	11253 - Qantas Airways Ltd	$197.25	$197.25
3	131421	17/03/13		2038819	11253 - Qantas Airways Ltd	$37.40	$37.40
4	132369	24/03/13		2038819	11253 - Qantas Airways Ltd	$164.40	$164.40
5	132670	26/03/13		2038819	11253 - Qantas Airways Ltd	$50.00	$50.00
6	132786	27/03/13		2038819	11253 - Qantas Airways Ltd	$39.55	$39.55
7	133186	31/03/13		2038819	11253 - Qantas Airways Ltd	$164.20	$164.20
					Subtotal: 11253 - Qantas Airways Ltd :	**$693.45**	**$693.45**
8	130741	19/03/13		00950903 008439	12417 - Cabcharge Australia Limited	$29.65	$29.65
					Subtotal: 12417 - Cabcharge Australia Limited :	**$29.65**	**$29.65**
9	129462	1/03/13		14116/M00196	13969 - Downer KGP Power Pty Ltd	$28.95	$28.95
10	128155	4/03/13		14116/M00196	13969 - Downer KGP Power Pty Ltd	$49.50	$49.50
11	131427	18/03/13		14116/M00196	13969 - Downer KGP Power Pty Ltd	$26.65	$26.65
12	131459	18/03/13		14116/M00196	13969 - Downer KGP Power Pty Ltd	$31.00	$31.00
13	131779	20/03/13		14116/M00196	13969 - Downer KGP Power Pty Ltd	$49.40	$49.40
14	132186	24/03/13		14116/M00196	13969 - Downer KGP Power Pty Ltd	$28.70	$28.70
15	132723	27/03/13		14114/M00585	13969 - Downer KGP Power Pty Ltd	$34.25	$34.25
16	130285	28/03/13		14116/M00196	13969 - Downer KGP Power Pty Ltd	$31.75	$31.75
					Subtotal: 13969 - Downer KGP Power Pty Ltd :	**$280.20**	**$280.20**
17	132748	27/03/13		PO 13526	21535 - Ashburton Aboriginal Corporation	$20.05	$20.05
					Subtotal: 21535 - Ashburton Aboriginal Corporation :	**$20.05**	**$20.05**
18	131409	17/03/13			30071 - Virgin Australia Airlines Pty Ltd	$58.50	$58.50
					Subtotal: 30071 - Virgin Australia Airlines Pty Ltd :	**$58.50**	**$58.50**
19	129751	3/03/13			4463 - Energy Developments Ltd	$66.80	$66.80
20	131491	18/03/13		156451	4463 - Energy Developments Ltd	$35.55	$35.55
21	132869	31/03/13		156451	4463 - Energy Developments Ltd	$65.40	$65.40
					Subtotal: 4463 - Energy Developments Ltd :	**$167.75**	**$167.75**
22	129765	3/03/13		Naws	5433 - Freo Group Ltd	$44.60	$44.60
23	129775	3/03/13			5433 - Freo Group Ltd	$50.00	$50.00

10.8. Sample End-of-shift Report

131 008 SWAN HILL TAXI CABS
AUSTRALIA WIDE TAXI
powered by smartMOVE

Taxi-Cabs Swan Hill
42 323 538 092
42323538092
PO Box 545
Swan Hill VIC 3585
Bookings: 131008
Office: 131008
Fax: (03) 5033 2923
Email: taxicabs.swanhill@bigpond.com.au

End of Shift Report

Driver:		Vehicle:	SH4 (C0346)	26/04/13 17:52 - 27/04/13 03:29

Cash float at start of shift	0.00
Bailee rate	50%
Lift fee	15.60
Bailee lift share rate	50%
Bailee toll rate	0%
Expenses paid by bailor	0.00

Expenses

Item	Paid By	Payor	Amount
		Total	0.00

Lift Fees

Number of Lift Fees	0
Total amount for Lift Fees	0.00

Income

	Metered takings	198.90
plus	Non-metered takings	0.00
	Total Income	198.90
plus	Total Tolls	0.00
	Total Takings	198.90

Cash reconciliation

	Total Takings	198.90
less	Account jobs (MA + NA)	(10.40)
less	Credit dockets (MC + NC)	(35.80)
less	Subsidy (MS + NS)	(13.45)
less	Expenses initially paid by bailee	0.00
plus	Cash float at start of shift	0.00
	Cash at end of shift (inc. float)	139.25

Shift Statistics

Odometer at the start:	185564
Odometer at the end:	185673
Shift total distance:	109
Total Jobs:	21
$ per Kilometer:	$1.82

Bailee

Net Income (50%)	99.45
Share of lift fees	0.00
Share of tolls	0.00
Bailee's Income	**99.45**
Expenses	0.00

Bailor

Net Income (50%)	99.45
Share of lift fees	0.00
Share of tolls	0.00
Bailor's income	**99.45**
Expenses	0.00
Cash to bailor (inc float)	**39.80**

Special Jobs

MA = metered account   NA = non-metered account   MS = metered subsidy
NS = non-metered subsidy   MC = metered credit docket   NC = non-metered credit docket
NX = non-metered cash

Booking ID	Detail	NX	MA	NA	MC	NC	MS	NS
394989					7.90			
394991							4.25	
394995	120572		3.60					
394995							3.60	
395025	107574		6.80					
395029							5.60	
395035					11.00			
395048					16.90			
	Totals	0.00	10.40	0.00	35.80	0.00	13.45	0.00

Job Summary

	Booking ID	Date	Start Time	End Time	Lift Fee	Fare $	Extras $	Toll $	Total $	Paid $	Tip $
1	394985	26/04/13	18:18	18:21	0	5.70	2.10	0.00	7.80	7.80	0.00
2	394989	26/04/13	18:38	18:41	0	5.80	2.10	0.00	7.90	7.90	0.00
3	394991	26/04/13	18:54	18:57	0	6.40	2.10	0.00	8.50	8.50	0.00
4	394994	26/04/13	19:06	19:08	0	4.90	2.10	0.00	7.00	7.00	0.00
5	394995	26/04/13	19:11	19:13	0	5.10	2.10	0.00	7.20	7.20	0.00
6	394996	26/04/13	19:20	19:23	0	7.20	2.10	0.00	9.30	9.30	0.00
7	395000	26/04/13	19:54	19:57	0	8.00	2.10	0.00	10.10	10.10	0.00
8	395002	26/04/13	20:03	20:05	0	5.90	2.10	0.00	8.00	8.00	0.00
9	395012	26/04/13	21:52	21:54	0	5.60	2.10	0.00	7.70	7.70	0.00
10	395014	26/04/13	22:06	22:09	0	7.30	0.00	0.00	7.30	7.30	0.00
11	395016	26/04/13	22:22	22:27	0	8.30	0.00	0.00	8.30	8.30	0.00
12	395018	26/04/13	22:46	22:50	0	7.60	2.10	0.00	9.70	9.70	0.00
13	395019	26/04/13	22:54	22:57	0	6.20	2.10	0.00	8.30	8.30	0.00
14	395026	26/04/13	23:01	23:03	0	4.80	0.00	0.00	4.80	4.80	0.00
15	395025	26/04/13	23:05	23:07	0	4.70	2.10	0.00	6.80	6.80	0.00
16	395029	26/04/13	23:58	00:04	0	9.10	2.10	0.00	11.20	11.20	0.00
17	395035	27/04/13	00:46	00:49	0	8.90	2.10	0.00	11.00	11.00	0.00
18	395036	27/04/13	01:27	01:32	0	10.80	2.10	0.00	12.90	12.90	0.00
19	395039	27/04/13	01:44	01:51	0	14.80	2.10	0.00	16.90	16.90	0.00
20	395042	27/04/13	02:34	02:36	0	9.20	2.10	0.00	11.30	11.30	0.00
21	395048	27/04/13	02:58	03:10	0	14.80	2.10	0.00	16.90	16.90	0.00
	Totals for 21 Jobs				0	161.10	37.80	0.00	198.90	198.90	0.00