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PtMS Mobile

PtMS for Windows is a network based software system using a **Windows SQL Server database**. It is designed to handle the process of taking trip requests for transportation services, scheduling those requests by assigning them to vehicles or providers, managing the delivery of the transportation services by assisting dispatchers with tracking the completion of the trips and making schedule adjustments/assignments as needed, and recording the completion of the services into a trip transaction/history table used to produce reports and billings.

PtMS Mobile is an extension of the PtMS for Windows transportation management, scheduling and reporting system. Its purpose is to improve the efficiency of the paratransit operation and improve the productivity of the service (more trips per hour).

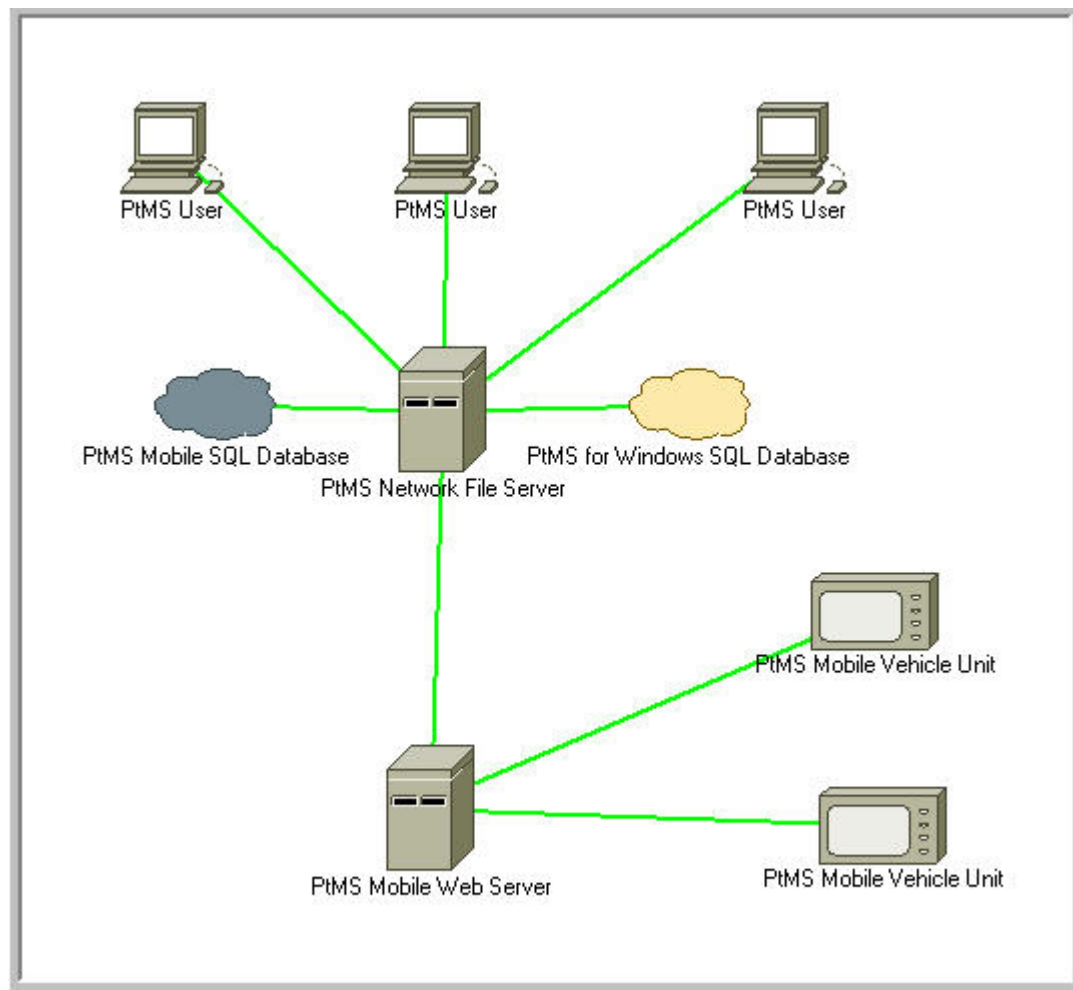
PtMS Mobile aims to achieve these by:

- **streamlining communication between dispatcher and driver**
- **capturing trip information electronically relieving the driver manual recording of trip results**
- **delivering schedule changes directly to the driver minimizing radio chatter**
- **updating the PtMS dispatcher's network system in real time with trip results**

This document will outline how the PtMS Mobile system is designed to achieve these results. It will cover the following components of the PtMS Mobile system:

- **PtMS Mobile Data Exchange Design (between PtMS for Windows and Mobile Units)**
- **PtMS Mobile Voice over Internet and Instant Messaging (IM)**
- **PtMS Mobile Database Design**
- **PtMS Mobile Unit (On-board Computer) Specifications**
- **PtMS Mobile Dispatcher User Interface**
- **PtMS Mobile Unit Driver User Interface**

Data Exchange



PtMS Mobile Data Exchange

The diagram above provides a visual description of how data is exchanged between the mobile units and the PtMS for Windows SQL Server database.

The types of information exchanged between PtMS Mobile Units and the PtMS for Windows Network database include:

1. **Schedules are delivered electronically to the vehicle Mobile Unit** eliminating the printing of each schedule, nor do the drivers have to make special arrangements to retrieve them each day.
2. **Schedule trip results are recorded electronically as they occur and automatically update the PtMS schedule trip record.** Drivers using a touch screen can complete recording trip results in seconds. The data is automatically transferred to the PtMS for Windows network database. Dispatchers see the trip results on their screen within minutes.
3. **GPS Vehicle Tracking data is continuously being sent from each vehicle to the PtMS Mobile database** allowing dispatchers to view vehicle progress and location in real time.
4. **Text Messages from Dispatch to Driver and Driver to Dispatch are delivered to the driver and dispatcher.**

Changes in PtMS for Windows SQL database are transferred to the PtMS Mobile database residing on the same network file server. These new data or changes to existing records are transferred to the secure PtMS Mobile web server which is connected to each of the mobile units. The mobile units update their local tables for display and display the information to the driver.

A copy of the data resides on the Mobile Unit so it does not have to maintain contact with the PtMS Mobile web server at all times. This allows for temporary interruptions in cell service.

PtMS Mobile Database Design

The **PtMS Mobile database specifications** detail the format of the exchange of information between the **PtMS for Windows SQL database** and the Mobile Units system residing in the vehicles. A SQL database called "ptmsmobile" is installed on the PtMS file server.

A description of the PtMS Mobile database tables is listed below:

The **Mobile_GPS** table will only be receiving data from the Mobile units. PtMS Mobile applications software will use this data to display active vehicle movement for the dispatcher using the Streets mapping software GPS functions. Dispatchers will be able to view vehicle movement for selected or all vehicles as needed.

The **Mobile_ToMDT table** will be updated by the PtMS for Windows Scheduling and Dispatching software. Next day schedule records will be loaded to this table starting at a time set by the user in the PtMS Mobile application software parameter table. Once this time is reached all schedule record and any changes in scheduler records for the next day will be sent to this table. Each time a change occurs in a PtMS schedule record in PtMS, a new record will be added to Mobile_ToMDT table with the changed field information. All changes to schedule records occurring during the day of service (i.e. today) will be sent to this table.

The **Mobile_FromMDT table** will contain records with data updates received from the MDTs. Fields that are updated by the MDT are preceded by "MDT" in the field name column. Data received by the MDT will be used to update the PtMS Schedule records for dispatching. It will then be posted into the PtMS TripTransactions table and VehicleServicesSummary table for reporting purposes. Updates to the PtMS Dispatching module will allow dispatchers to monitor change in trip status, arrival times, departure times, etc as they are occurring and received from the MDTs.

The **Mobile_Comm table** will contain dispatch messages sent to the vehicle/MDT by the dispatcher and messages received from the dispatchers. The PtMS Dispatch application will provide the dispatcher with the user interface to both send messages to the vehicle/MDT and view messages received from the vehicle/MDT.

PtMS Mobile Database Field Definitions

Click [here](#) to list the PtMS Mobile SQL Database field definitions.

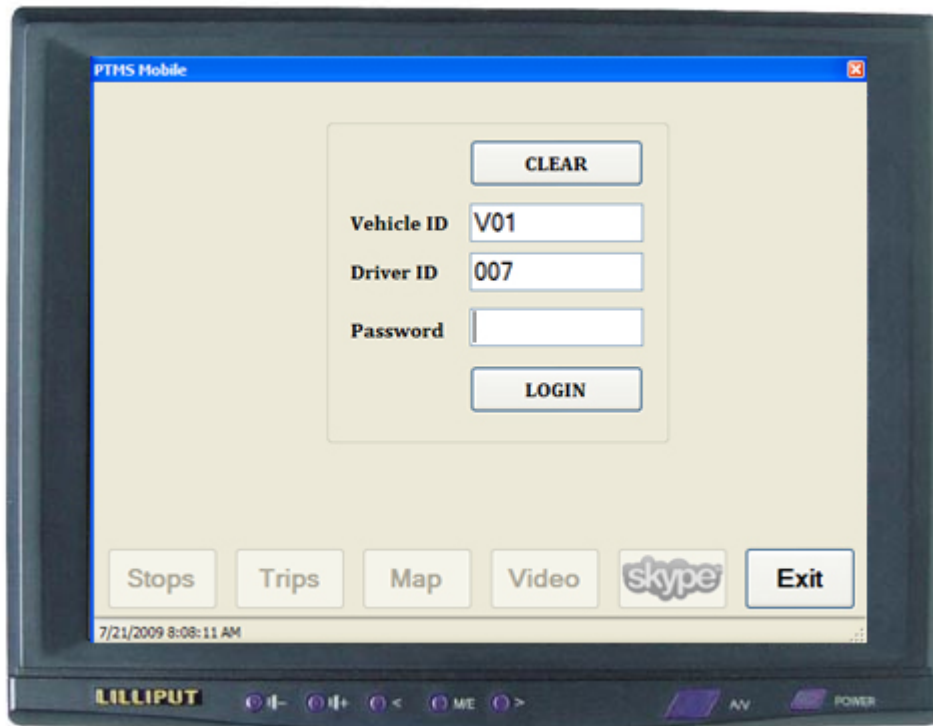
PtMS for Windows SQL Database

Click [here](#) to list the PtMS for Windows SQL Database documentation.

PtMS Mobile Unit Hardware Specifications

PtMS Mobile Unit hardware specifications lists that actual hardware and operating system software components included in the mobile unit. Click [here](#) to list the specifications in detail.

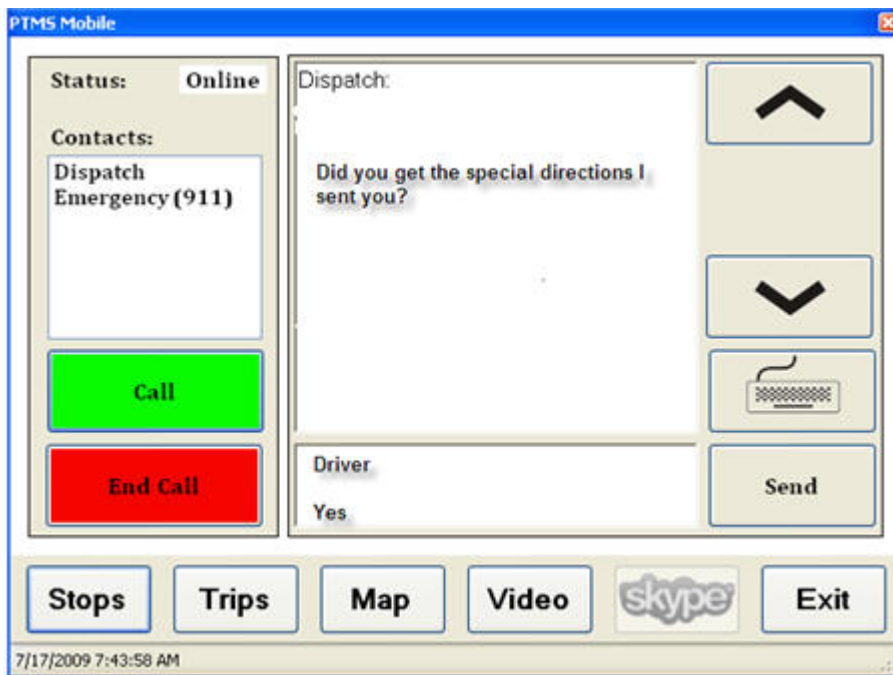




Voice Communications and Instant Messaging

ABS has selected [Skype](#) for its voice and instant messaging software solution. Skype is the leading voice over Internet company and provides companies and users with free phone and instant messaging services with Skype accounts. Each Driver will be setup with a Skype phone number organized under a

single company Skype account for the PtMS Mobile system user (e.g. Paratransit Company ABC). When a driver logs into this Mobile Unit the system will automatically log him into his Skype account so he can send or receive calls and instant messages to Dispatch.



If video units are installed in the vehicle, voice call will automatically trigger video calling so dispatch and drivers can see each other.

Skype provides the following features for PtMS Mobile Users:

Calls: driver to dispatch or dispatch to driver hands free voice (and video) connections

Conference Calls: Dispatcher can add multiple drivers to a single conference call if needed with a single click.

Instant Messaging: Instant messaging (IM) is a real-time alternative to calling. when it's not a good time to talk. Simply type your conversation instead. This is especially useful when sending driver instructions.

Skype saves the full message history on your computer, so you can go back through your old messages. This can be useful for both dispatcher and driver.

Group Instant Messaging: This feature is especially useful for the dispatcher as they can send a message to all drivers, or special driver groups at once.

Video Recording

Video Recording of the vehicle can be initiated by the Driver by pressing the video button or by the

Dispatcher remotely from home base. The unit can also be set to randomly or at specific times record transport times (when passengers are on the vehicle) for review later by supervisor staff. This can be used to help investigate service complaints or general supervision.

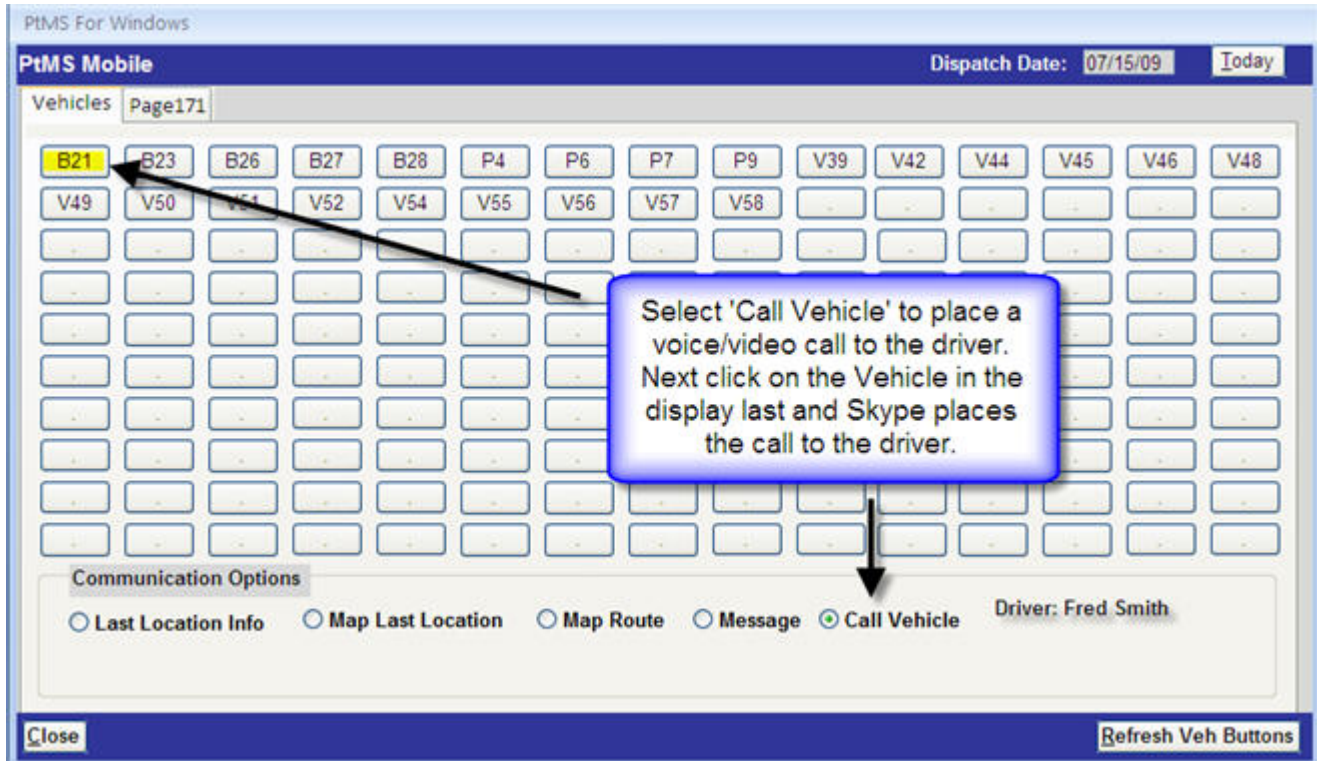


PtMS for Windows Dispatcher User Interface

Dispatchers using PtMS for Windows have a number of tools available to them. These include:
Here is a list of PtMS Mobile tools available to the dispatcher.

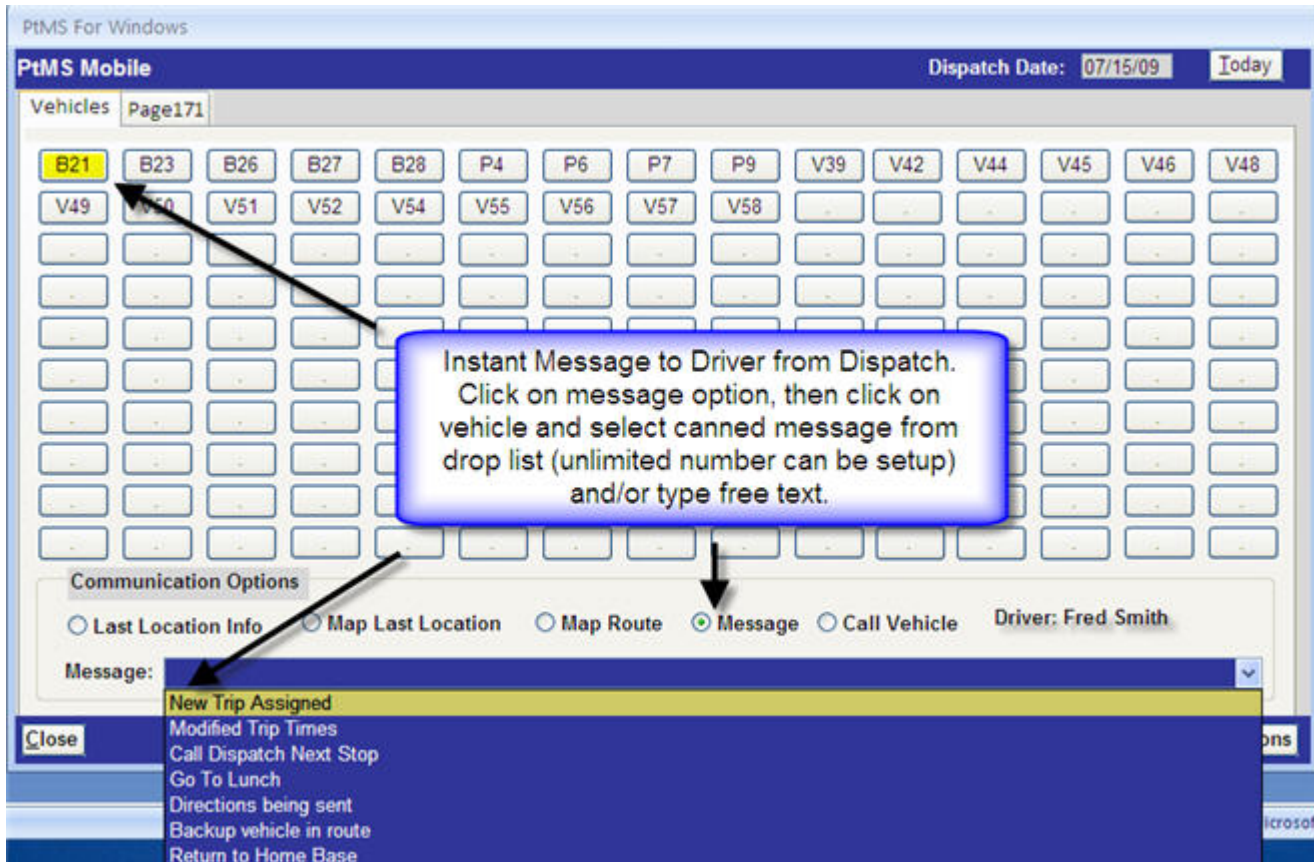
- Voice-Video Calls
- Instant Messaging
- GPS Vehicle Tracking
- Tracking PtMS Trips Status
- Trip Adjustments - Vehicle, Times, Locations
- Monitoring of Vehicle On-time Performance

Voice-Video Calls



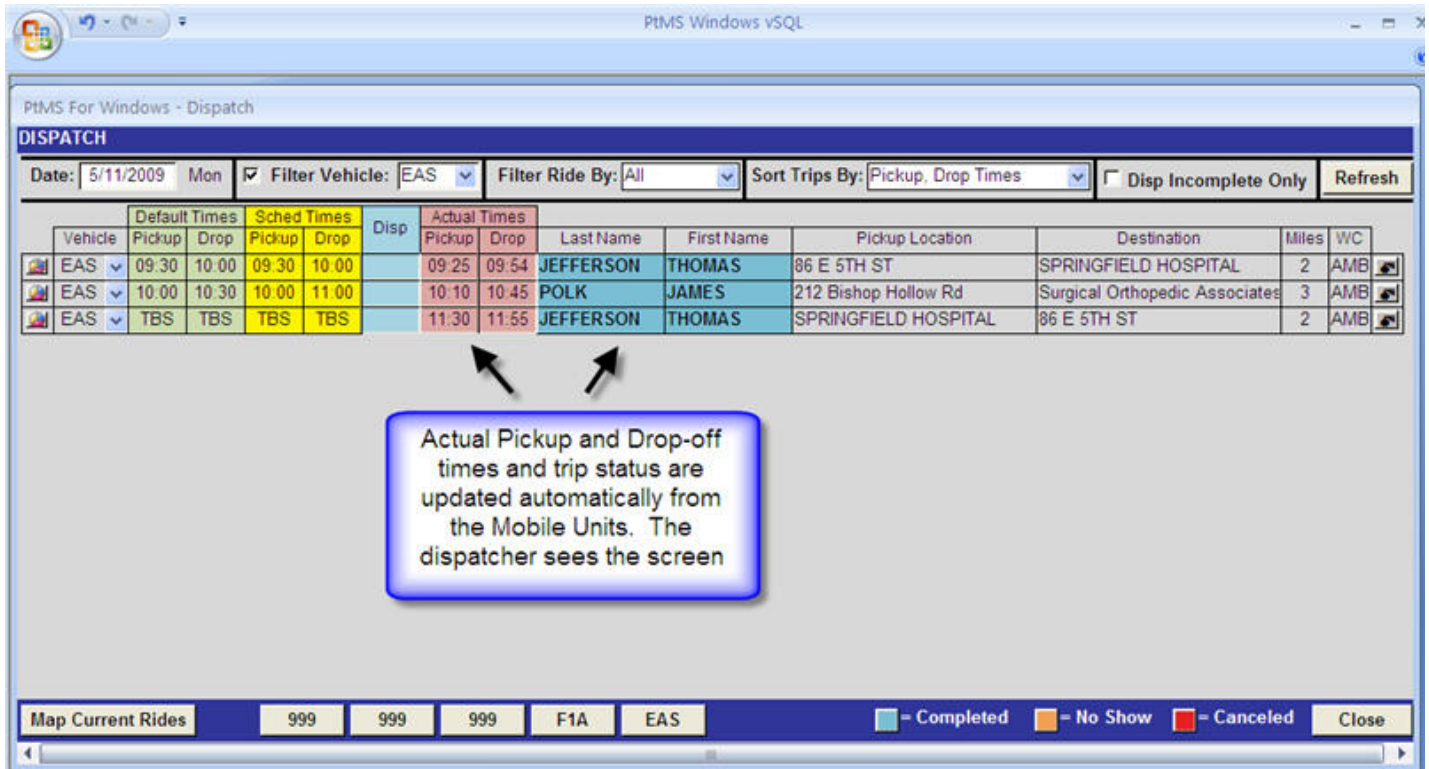
Instant Messaging

Simple text messages can be sent instantly to a driver(s) by the dispatcher using the Messaging feature. These are primarily pre-configured text messages. The dispatcher could select from a menu of messages to send to a driver/vehicle or can enter free text, or append text to a canned message. Skype delivers these messages to the Driver's Mobile Unit within seconds.



Tracking PtMS Trips Status

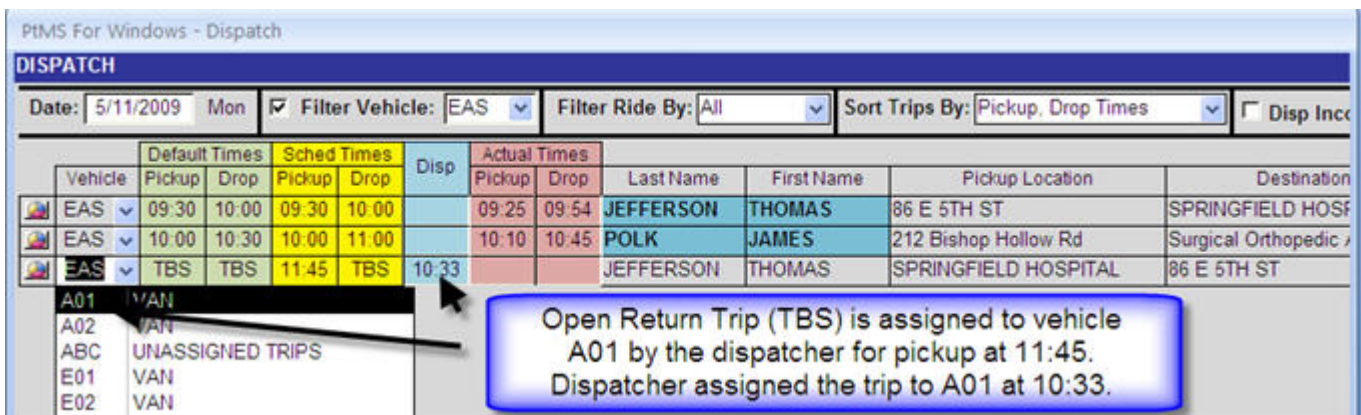
As Mobile Unit data updates the PtMS SQL database, the dispatchers screen is updated with the current trip status (see color codes - blue=completed, red=cancelled), and the actual pickup and drop-off times of each trip.



If Dispatcher updates a trip status, such as cancellation a trip, then this information is sent to the mobile unit as a text message, and the trip is marked as cancelled and removed from their schedule.

Trip Adjustments - Vehicle, Times, Locations

Trip changes, adjustments, vehicle assignments etc made by the dispatcher are sent to the Mobile Unit along with a text message indicating trip times, status, or location have been adjusted. If the trip has been re-assigned to a new vehicle, a text message and cancellation are sent to the original vehicle, and a new trip test message is sent to the new vehicle assignment Mobile Unit.



Monitoring Vehicle On-Time Performance

The dispatcher can display the current on-time schedule status of all active vehicles in a browse display.

If a vehicle is running late, the vehicle row will be highlighted. This will allow the dispatcher to determine if some action is needed such as removing a scheduled trip from a driver's schedule and re-assigning it to ass the driver with getting back on schedule.

Schedule Status	Date	Day	Vehicle	Driver	Last Stop Arrival Tim	Last Stop Schedule	Last Stop Address	Next Stop Schedule	Next Stop Address
On Time	7/20/2009	Monday	V01	SMP	8:25	8:30	Springfield Hospital	9:00	124 West Ave, Media

GPS Vehicle Tracking

The **PtMS Mobile Unit is equipped with a GPS device that transmits GPS coordinates on a preset interval** to the PtMS Mobile Database. Transmission frequency can be varied based on setup parameters in the Mobile Unit. GPS tracking records every 1,2 or 3 minutes are typical settings.

GPS tracking records the longitude and latitude of the vehicle, the vehicle id, and the time the tracking record was collected. If a connection with the PtMS Mobile website is not available at the time the record is created due to interruptions in the cell service, the record is stored on the Mobile Unit and is transmitted at the next available connection time.

Last Vehicle Location

Displaying the last vehicle location shows where the vehicle was located with its most recent GPS update (within the last 1-2 minutes depending on setting). This display can be either text (nearest intersection) or map. One, several or all vehicles can be selected for displaying the last vehicle location(s).

The screenshot shows the PtMS Mobile software interface. At the top, it says 'PtMS For Windows' and 'PtMS Mobile'. The 'Dispatch Date' is set to '07/15/09' and 'Today'. Below this is a grid of vehicle buttons labeled B21, B23, B26, B27, B28, P4, P6, P7, P9, V39, V42, V44, V45, V46, V48, V49, V50, V51, V52, V54, V55, V56, V57, V58. A blue callout box on the left contains the text: 'Select function "Last Location Info" then click on the vehicle(s) and the message box will display the intersection nearest to where the vehicle is most recently located.' An arrow points from this box to a dialog box titled 'Last Location Info for B21'. The dialog box contains the following information: 'Vehicle: B21', 'Date/Time: 7/15/2009 10:39', 'Closest Cross Street:--> "Pershing Ave / State Rte 168"', and 'Speed:'. There is an 'OK' button at the bottom of the dialog box. Below the vehicle grid is a 'Functions' section with radio buttons for 'Last Location Info' (selected), 'Map Last Location', 'Map Route', 'Message', and 'Call Vehicle'. At the bottom of the interface are 'Close' and 'Refresh Veh Buttons' buttons.

PtMS For Windows

PtMS Mobile Dispatch Date: 07/15/09 Today

Vehicles

B21	B23	B26	B27	B28	P4	P6	P7	P9	V39	V42	V44	V45	V46	V48
V49	V50	V51	V52	V54	V55	V56	V57	V58						

Functions

Last Location Info Map Last Location Map Route Message Call Vehicle

Close Refresh Veh Buttons

Select 'Map Last Location', then select vehicle to display vehicle's most recent location on the map.

Streets On A Disk, 2009

File Maps Edit Options Search Route GPS Help

Range: 0.7 mile(s)

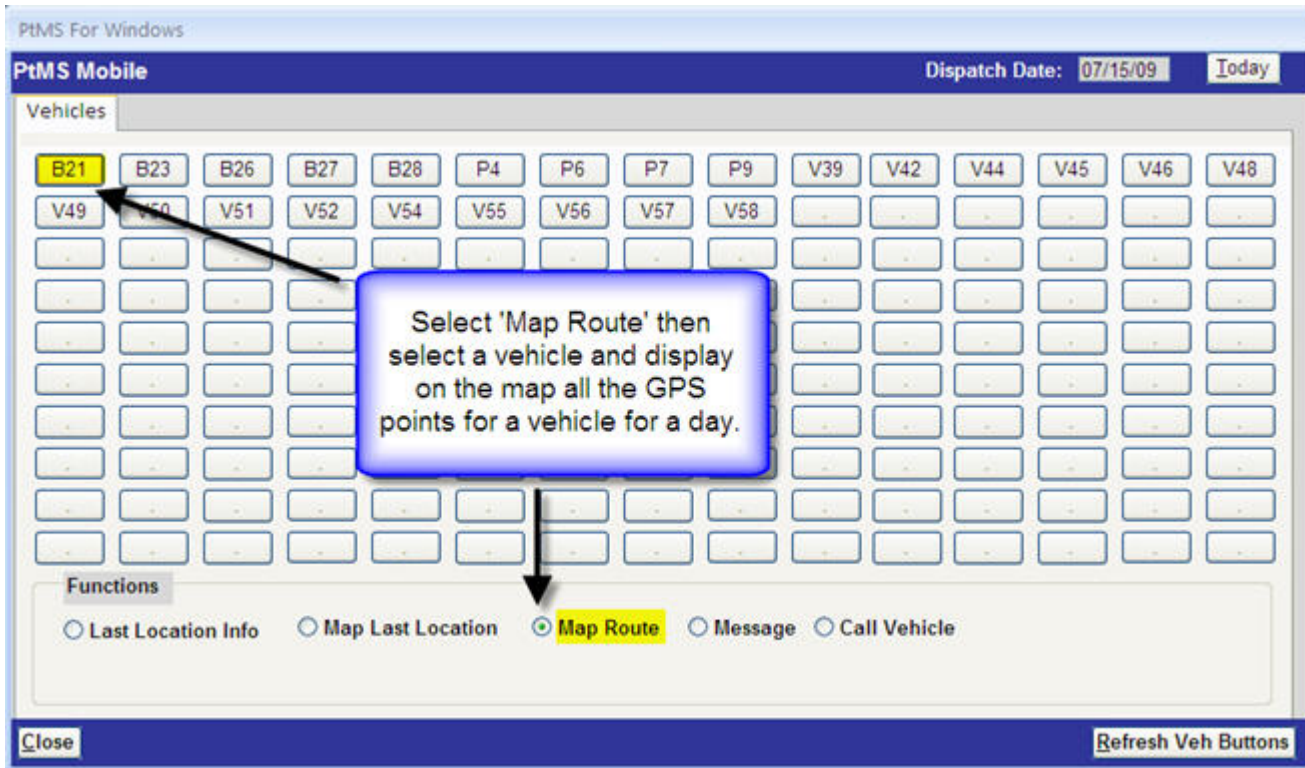
Select Map "Last Location", then click on the vehicle and the most recent location for the vehicle displays on the map.

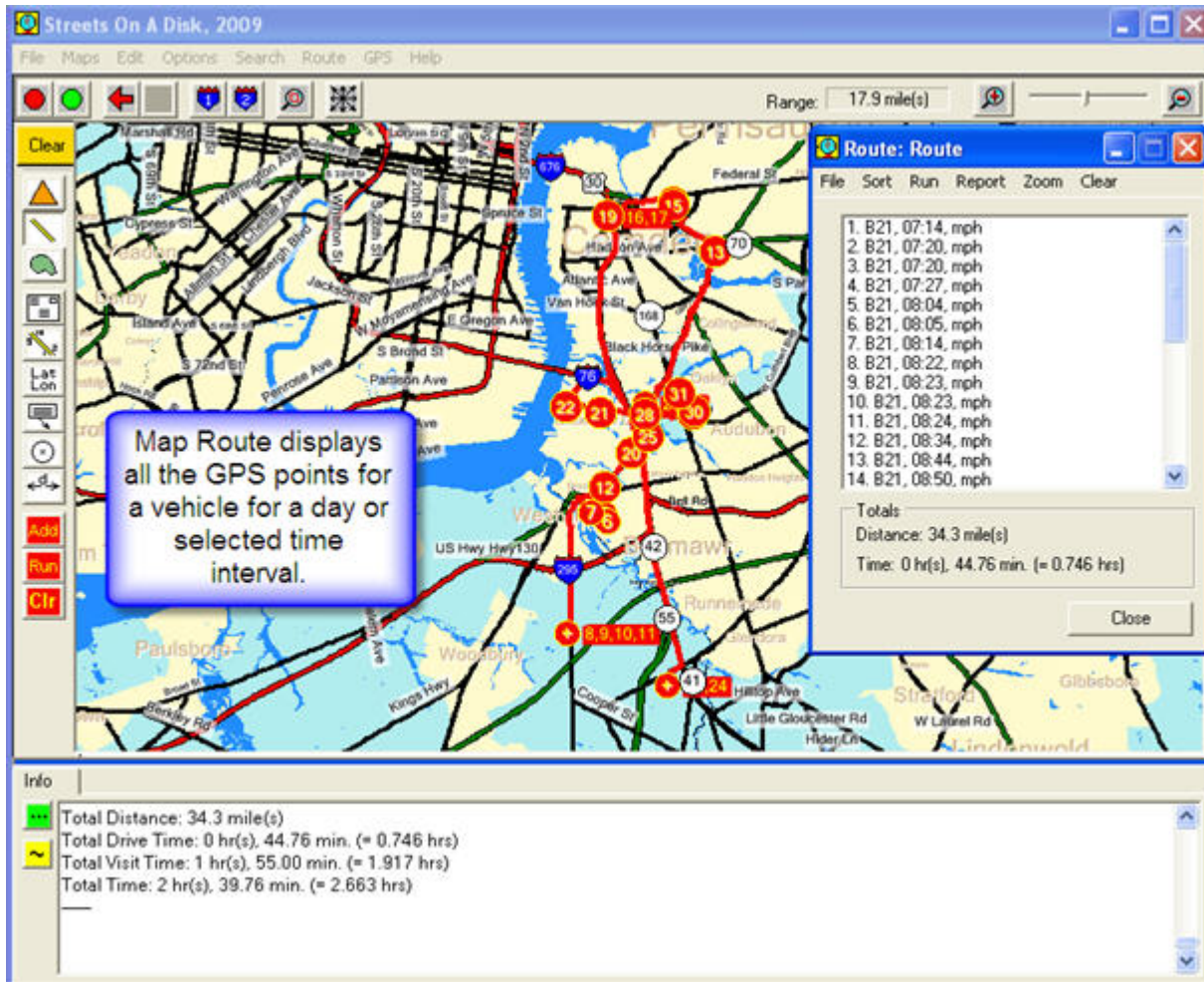
Info

1. B21

Map Route

Map Route shows the continuous tracking of one vehicle over a selected period of time. This can assist the dispatcher with evaluation the on-time performance of a vehicle.





Mobile Unit Driver User Interface

This section details the Mobile Unit Driver interface. How the driver interacts with the Mobile Unit to obtain schedule information, driving instructions, messaging and voice calls with dispatch, and record stop and trip tracking information.

Driver Login

Driver Logon: Power on the mobile unit requires the Driver to enter their Driver ID and password then press the Login button to logon to the Mobile Unit.

PTMS Mobile

CLEAR

Vehicle ID V01

Driver ID 007

Password ●●●

LOGIN

Stops Trips Map Video skype Exit

7/16/2009 2:56:55 PM

The Mobile Unit then displays the Driver information, date and time and starting odometer reading which the driver can adjust. The Driver presses the Accept button to continue.

PTMS Mobile

Vehicle V01

Driver John Adams

Location Media, PA

Date 7/16/2009

Time 3:17 PM

Odometer 43987

DECLINE ACCEPT

Stops Trips Map Video skype Exit

7/16/2009 3:17:18 PM

Vehicle Stops

Stops Display:

The Toolbar at the bottom of the Mobile unit controls what information/functions are available to the Driver. The Stops display appears first when the Driver Logons. This displays each vehicle stop on the driver's schedule. The columns on the display include:

The screenshot shows the PtMS Mobile application interface. At the top, there is a title bar with 'PtMS Mobile' and a close button. Below the title bar is a table with the following columns: Location, City, STime, ArrvTime, Odom, Pickups, and DropOffs. The table contains four rows of data. The first row is highlighted in blue. Below the table is a navigation bar with buttons for 'Stops', 'Trips', 'Map', 'Video', 'skype', and 'Exit'. At the bottom left of the interface, the date and time '7/16/2009 3:20:33 PM' are displayed.

	Location	City	STime	ArrvTime	Odom	Pickups	DropOffs
▶	86 E 5th ST	Media	07:55	07:54	43987	1	0
	122 E Jefferson ST	Media	08:10			1	0
	414 Meetinghouse LN	Media	08:20			1	0
	Crozer Chester Med	Chester	09:00			0	3

Location: this is the pickup or drop-off address.

City: the pickup or drop-off city.

STime: the scheduled pickup or drop-off time.

ArrvTime: the actual time the vehicle arrives at the stop.

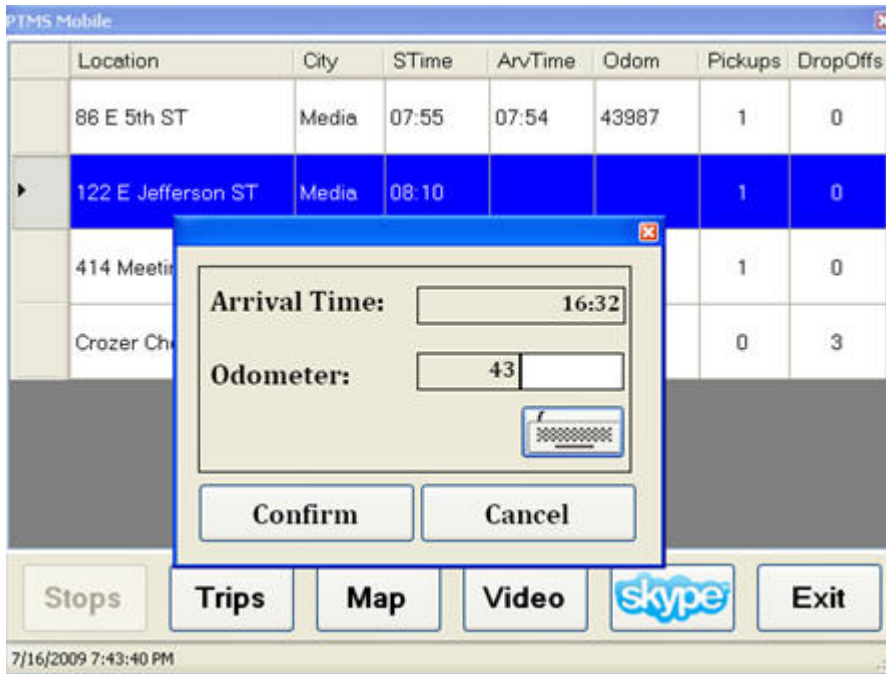
Pickups: the number of passengers being picked up at the stop.

Dropoffs: the number of passengers being dropped off at the stop.

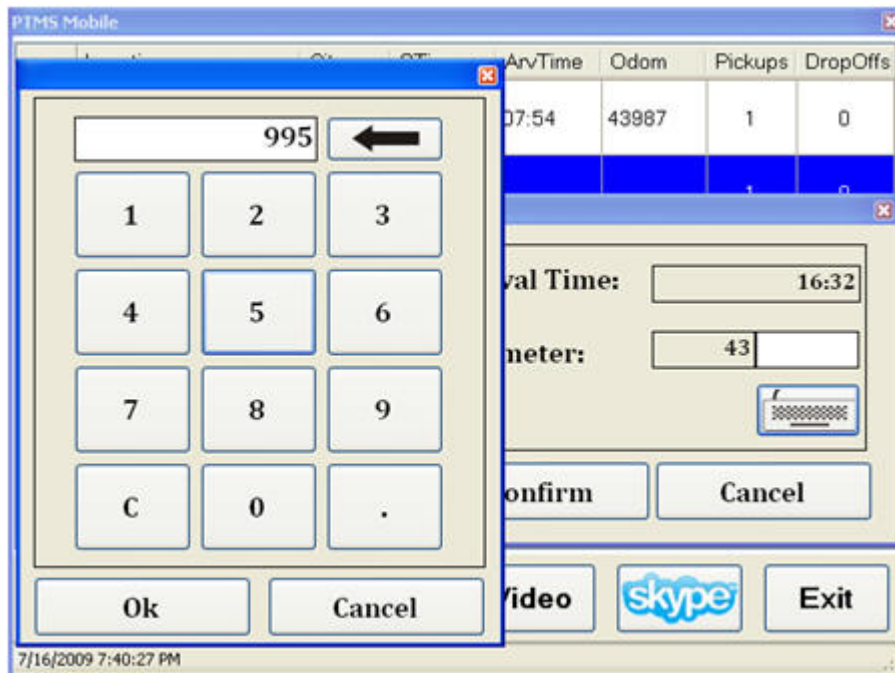
Updating Stop Records

Updating Stop Arrival Time and Odometer Reading:

Once the vehicle arrives at a stop the driver presses the highlighted stop record (the current stop) and the Arrival Time is automatically updated and displayed.



The driver touches the Keyboard button to display the virtual keyboard and inputs the last 3 odometer digits. Then touches OK to close the dialogue box.



The stop record is updated.

Passenger Trips

The **Trips display** shows the list of individual passenger pickups and drop-offs occurring at each stop. This display also allows the driver to update the trip status and the fare collection for each passenger.

Time	PD	Location	City	Lastname	Firstname	Status	Fare	Paid
07:55	P	86 E 5th ST	Media	Jefferson	Thomas	P/D	\$40.00	<input checked="" type="checkbox"/>
08:10		122 E Jefferson ST	Media	Washington	George			<input type="checkbox"/>
08:20		414 Meetinghouse LN	Media	Truman	Harry			<input type="checkbox"/>
09:00		Crozer Chester Med	Chester	Jefferson	Thomas			<input type="checkbox"/>
09:00		Crozer Chester Med	Chester	Truman	Harry			<input type="checkbox"/>
09:00		Crozer Chester Med	Chester	Washington	George			<input type="checkbox"/>

[Details >>](#)

[Stops](#)
[Trips](#)
[Map](#)
[Video](#)

[Exit](#)

7/16/2009 7:57:23 PM

Trips Display:

The Trips display columns include:

Time: Time of Pickup or Drop-off

PD: P indicates pickup; D indicates drop-off

Location: Pickup or Drop-off address

City: Pickup or Drop-off city

Last Name: Passenger last name

First Name: Passenger first name

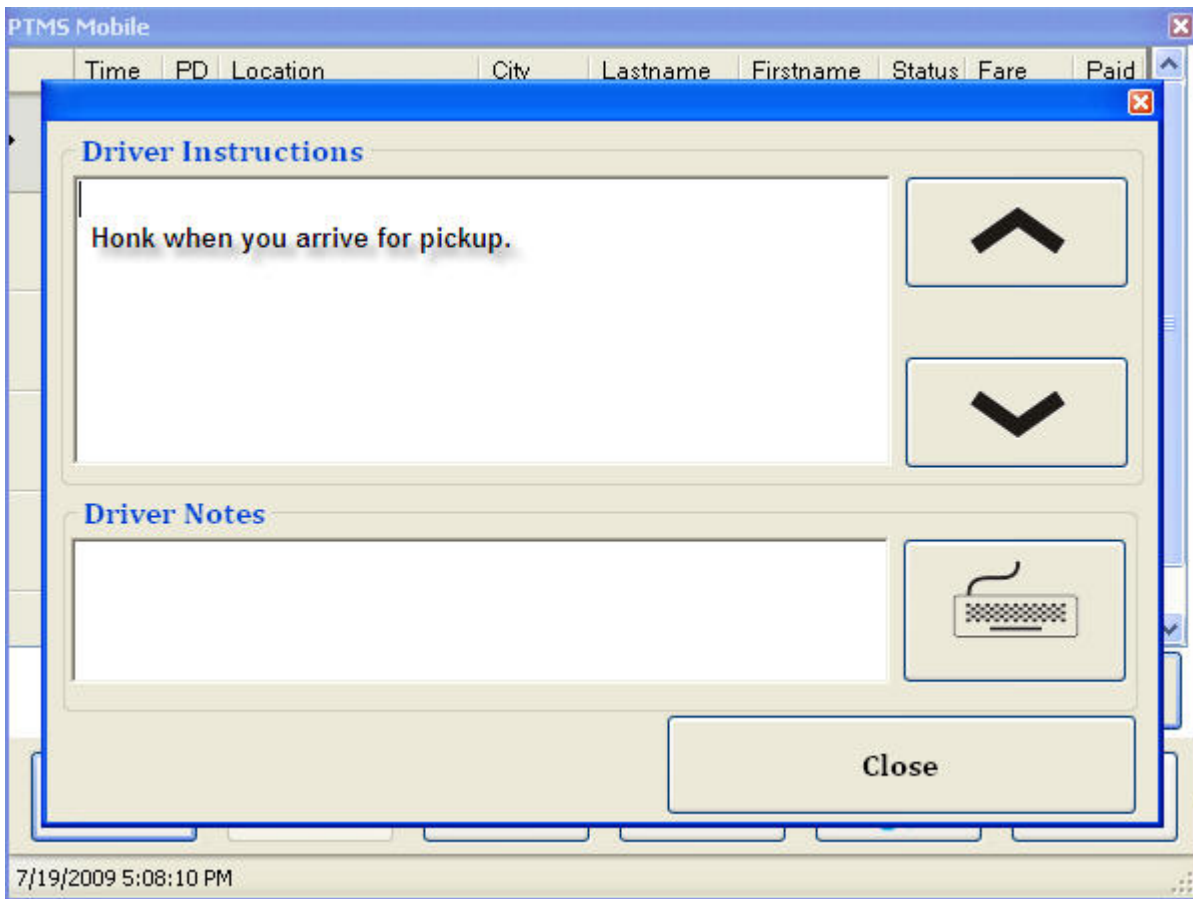
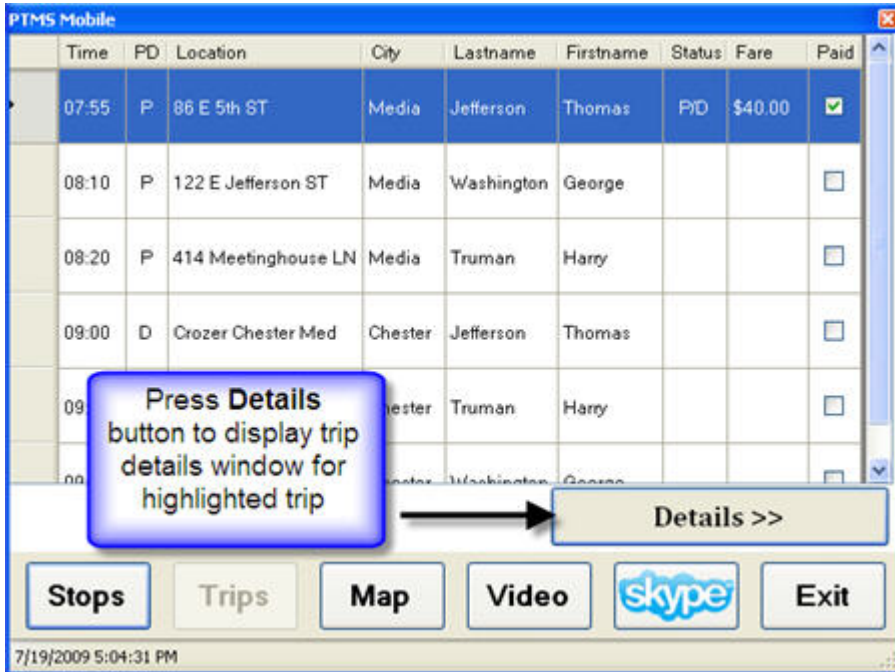
Status: C=Cancel; N=No Show; P or D to indicate completed pickup or drop-off

Fare: If passenger boarding fare is to be collected this will display fare amount

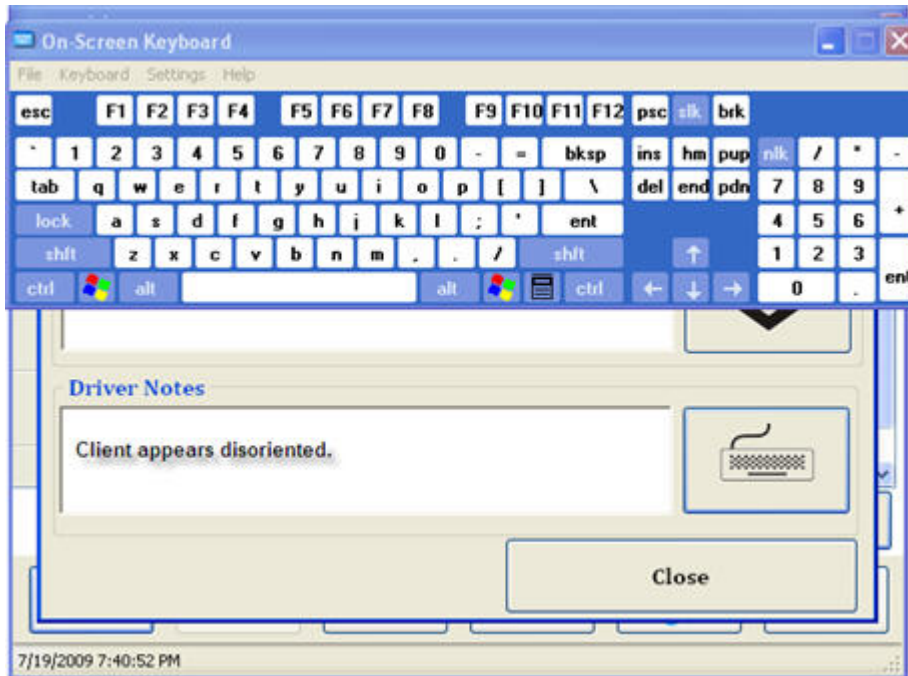
Paid: Is checked to confirm the boardin

Trip Detail

Press the trip **Details button** to display special driver instructions or driver notes.

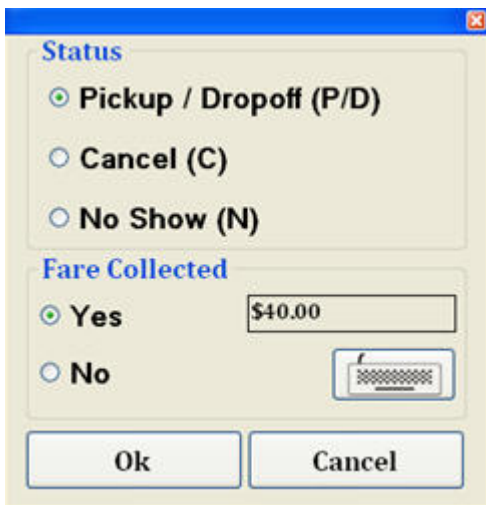


Drivers can add notes to the 'Driver Notes' section by pressing the Virtual Keyboard button. After adding any Driver Notes to the trip record the driver presses the Close button to close the trip Details window and save the notes.



Updating Trip Status and Fares Collected

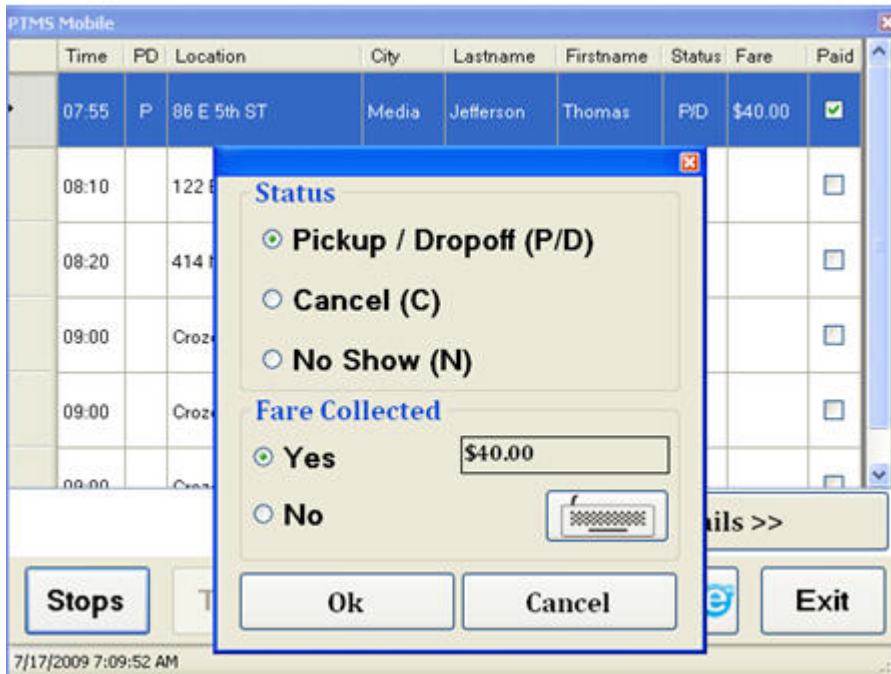
To update a trip record the driver presses on the trip record to display the Trip Status/Fares dialogue box.



First, select the status category (Pickup/Drop-off, No Show, or Cancel) that applies to the trip.

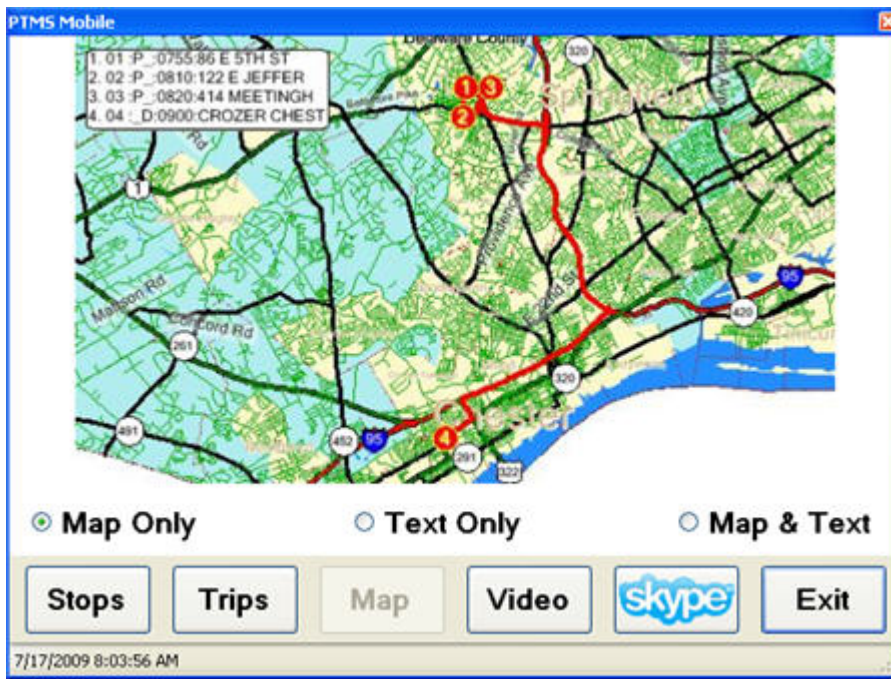
Next, if the fare is displayed select Yes to confirm it was collected or No to indicate no fare was collected.

Press OK to close the dialogue box. This must be completed for pickup and drop-off trip record at the stop before the driver can move off the trips screen

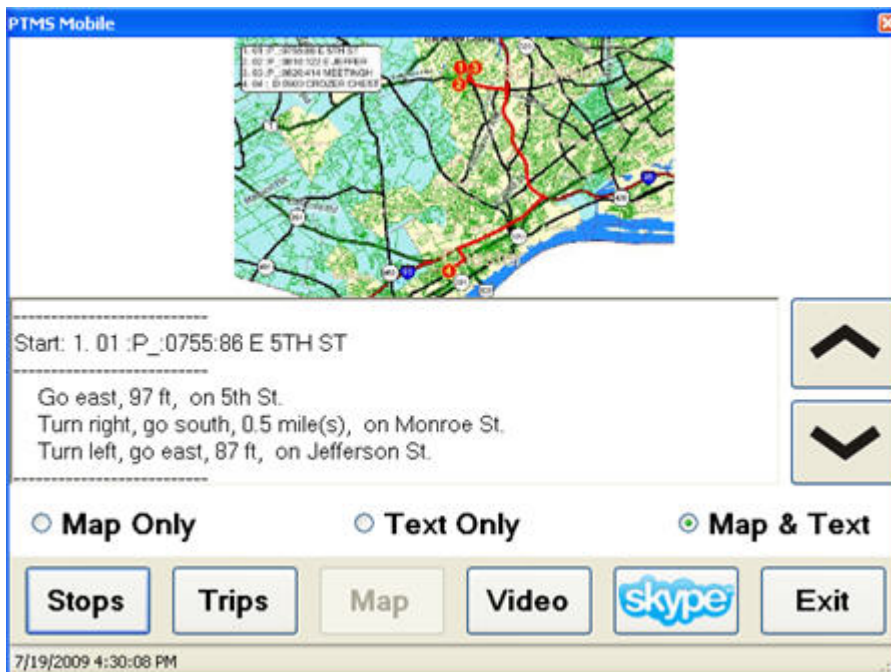
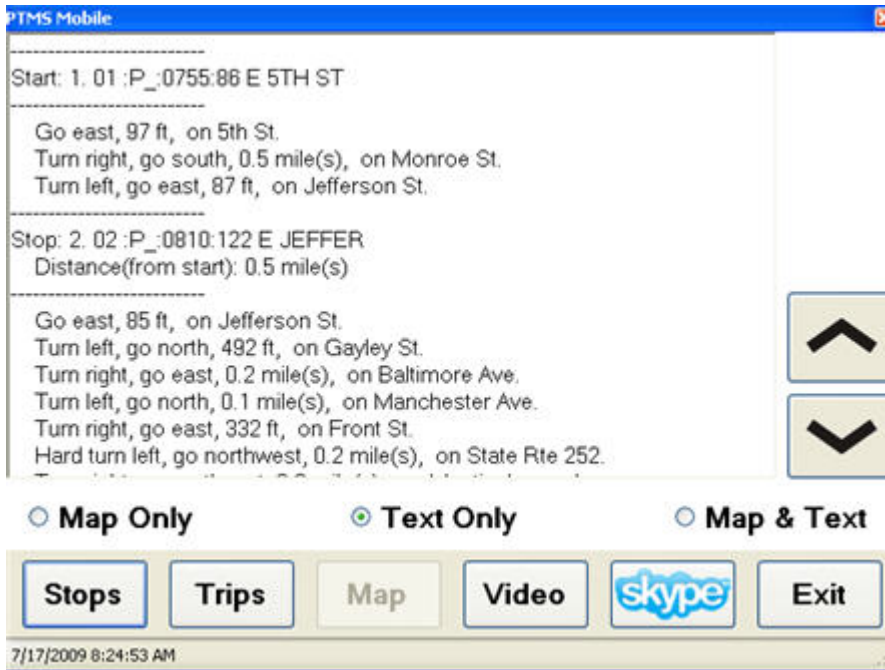


Map

The **Map** option on the tool bar allows the user to display the map for all the stops displayed on the Stop screen (this is limited to 6 stops on the scheduled route at one time) or the current stop and the next stop giving the driver direction to just the next stop.



The driver can select Map only, Text only (directions) or Map and Text.

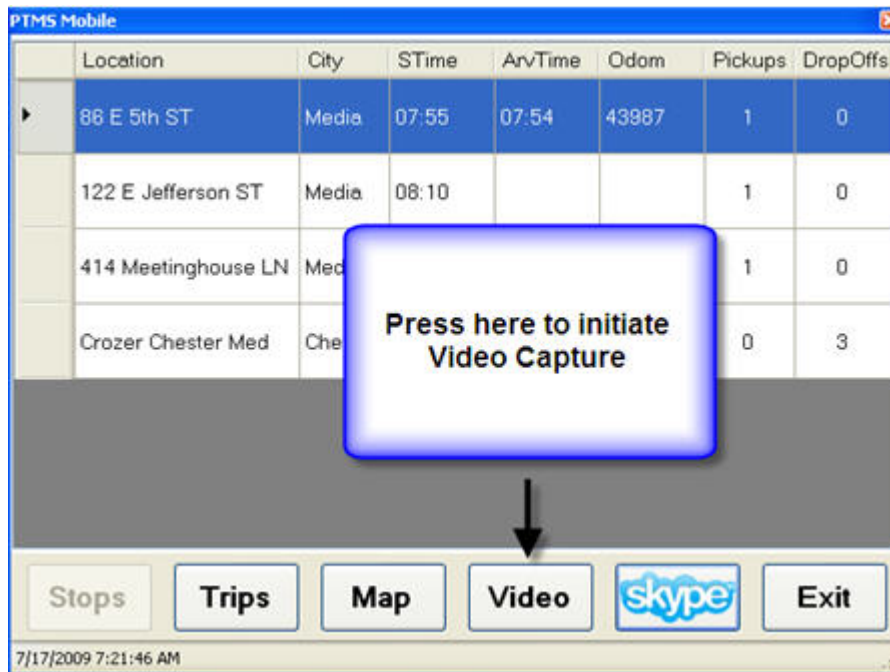


Video

The **Video** button on the Mobile Unit toolbar initiates video capture of the vehicle's interior from the camera mounted next to the mobile unit with a complete view of the vehicle. By selecting another option on the toolbar video capture is terminated.

This feature is designed to allow the driver to quickly initiate video capture if an event occurs that requires video documentation. This could include an accident, fight, acting out, seizure or other event requiring video documentation.

Videos are stored on the Mobile Unit for later retrieval as needed.



	Location	City	STime	ArvTime	Odom	Pickups	DropOffs
▶	86 E 5th ST	Media	07:55	07:54	43987	1	0
	122 E Jefferson ST	Media	08:10			1	0
	414 Meetinghouse LN	Med				1	0
	Crozer Chester Med	Che				0	3

Press here to initiate Video Capture

Stops Trips Map Video skype Exit

7/17/2009 7:21:46 AM



Skype

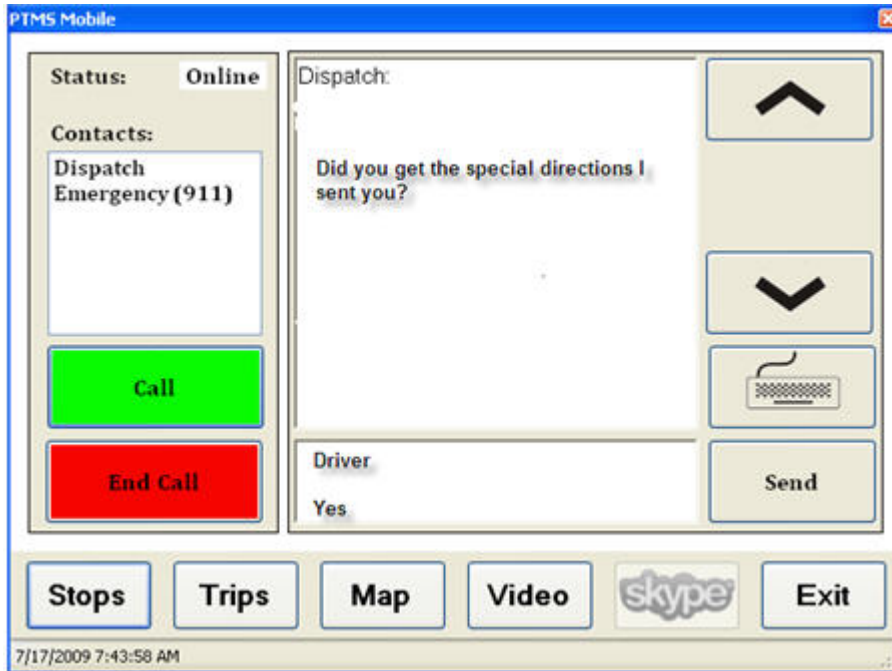
Skype (Voice Calls and Instant Messaging):

The PtMS mobile unit is configured to use [Skype](#) for its voice-video and instant messaging communication. ABS has utilized the Skype API (applications programming interface) to integrate Skype calling voice over Internet, video calling, and instant messaging features directly into the PtMS Mobile system.

Video-Voice Calls

Video Calling

Selecting the Skype option on the tool bar allows the driver to initiate a call to any of the numbers included in his call list. Standard phone numbers listed are the PtMS dispatcher, an Alarm call, and 911.



Dispatcher Call - connects the driver to the dispatcher for a hands free video/voice call.

Alarm call - this places a call to dispatch, and automatically sends an instant message and PtMS text message to dispatch indicating there is an alarm condition in the vehicle. This also automatically a video record connection for the dispatcher.

911 Call - this initiates an alarm as listed above plus calls 911 for the driver.

The PtMS Mobile Unit can be configured to include other phone numbers in the call list. For example, the phone number for the next stop on the schedule. This will allow the driver to call the client as the arrive at the stop, or call the facility (doctor's office, etc) as they pull up to curb side to indicate they have arrived for pickup or drop-off.

Note once the call is initiated the entire call dialogue is hands free. With a video cam included with the mobile unit Skype will initiate video with the phone call.

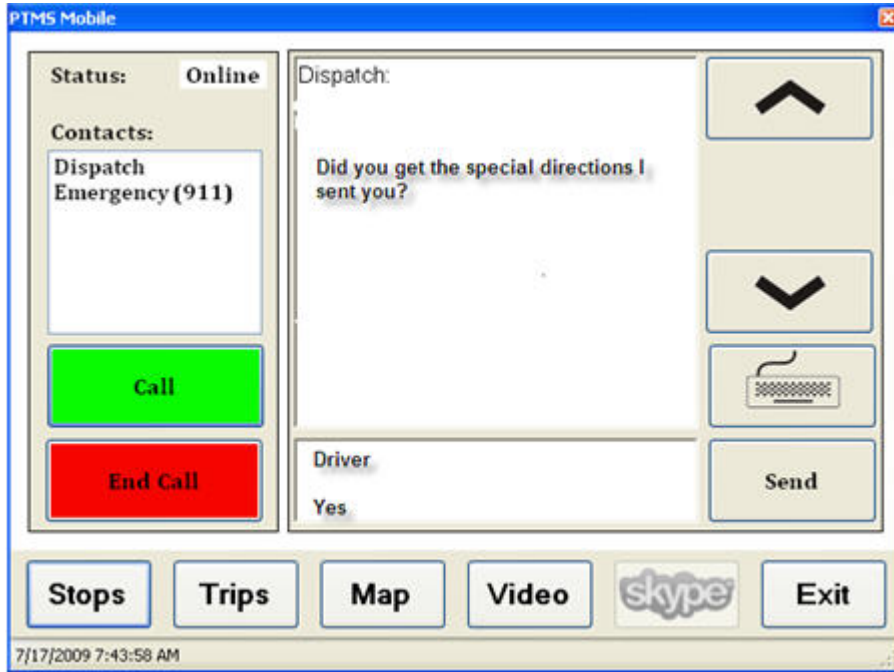
Note once the call is initiated the entire call dialogue is hands free. With a video cam included with the unit Skype will initiate video with the phone call.

Instant Messaging

If the driver tries to call dispatch and the call will not go through (for example, dispatch is handling an emergency) the driver can send an instant message to the dispatcher.

Since **Skype maintains an instant message history for all users**, dispatch can field these messages and respond to them as needed.

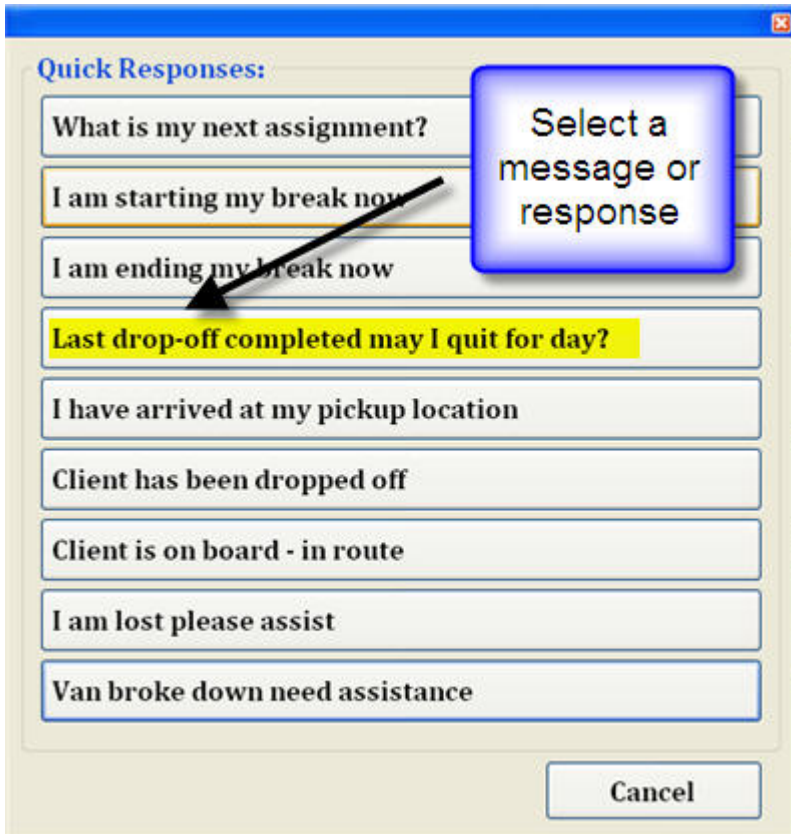
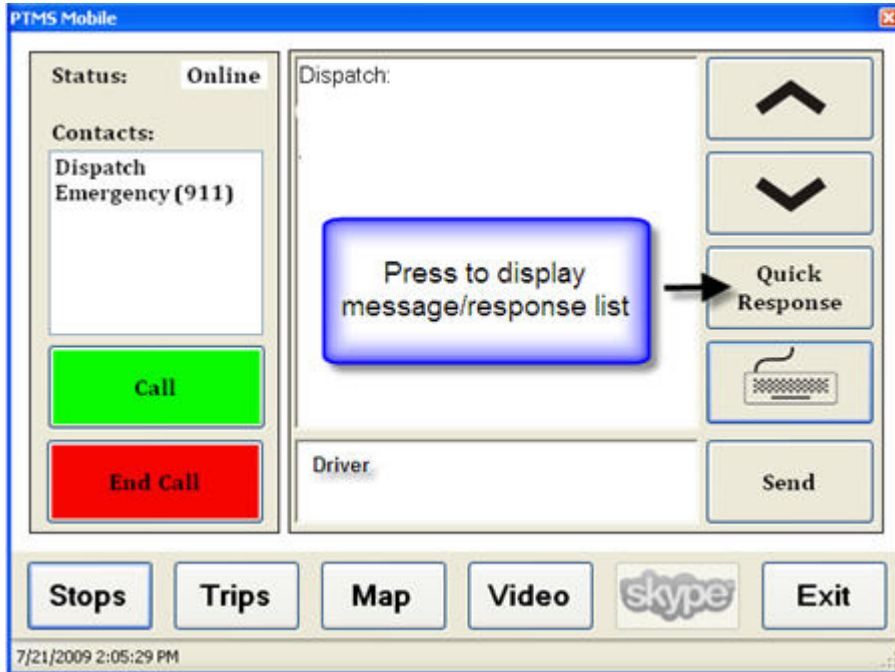
A **Group Instant Messaging** also allows dispatch to send messages or special instructions, etc to the one driver, a set of drivers or all drivers while engaged in a voice call with the driver.

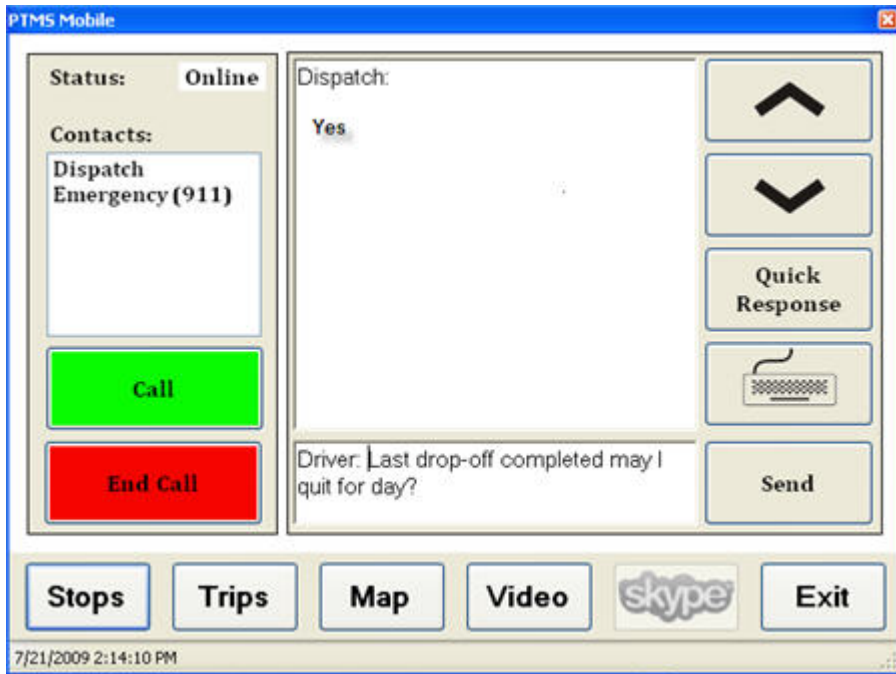


Quick Response or "Canned" Messages

The Mobile Unit Instant Message module includes a "Quick Response" button that displays a set of pre-configured messages or responses the driver can select from to eliminate typing. There is no limit on the number of messages/responses that can be added to this list. For example, typical questions as well as responses (Yes, No) can be added to the list.

Press the "Quick Response" to display the message/response list.





PtMS Mobile Unit Interactive Demo

Click [here](#) to run an interactive mobile unit demonstration. The demonstration password is "abs".