ATSIM
USER’S GUIDE

Developed for:
Public Transit Office
Florida Department of Transportation

Developed by:
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in association with
Center for Urban Transportation Research
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Introduction

This guide provides detailed guidance on how to effectively use the Automated Transit Stop Inventory System (ATSIM). It assumes that the user is familiar with the general operation of a PDA (Personal Digital Assistant) and the Microsoft Windows CE operating system.

Why Transit Stop Inventory?

Transit stop inventory is needed for tracking the location of stops, identifying the type and conditions of amenities, determining how well areas of interest are served by transit service, assessing the accessibility for disabled persons and ADA compliance, upgrading the right-of-way appearance, etc. The advent of Advanced Public Transportation Systems (APTS) makes it even more important for transit agencies to keep an up-to-date inventory of transit stop data. To implement APTS projects such as automatic passenger counters, automatic vehicle locators, computerized trip planners, and automatic voice annunciation systems, an accurate transit stop inventory is necessary.

What is ATSIM?

ATSIM is a system designed for the collection and application of Florida’s standard transit stop inventory for transit agencies in Florida. ATSIM consists of the following system components:

1. A PDA (model: HP iPAQ hw6515) which comes with a built-in GPS (Global Positioning System) and a built-in digital camera.

2. An integrated software system for the field collection of Florida’s standard transit stop attributes, GPS locations, and digital pictures.

3. A post-processing software system for the integration of field data and creation of GIS shape files.

4. A set of GIS analysis tools customized for applications of the standard inventory.
Components 3 and 4 have been developed as part of the Florida Transit Geographic Information System (FTGIS)—a user-friendly GIS component of the Florida Transit Information System (FTIS). For more information on FTGIS and FTIS, please visit: http://www.letr.fiu.edu/ftis.

The development of ATSIM has been sponsored by the Public Transit Office of the Florida Department of Transportation (FDOT). The entire software system, including FTIS, is available to Florida transit agencies free of charge.

**Why ATSIM?**

The traditional methods of collecting transit stop inventory using clipboard, pencil, and paper are time-consuming, inaccurate, and difficult to update. This often culminates to the reluctance of transit agencies to commit resources to such effort. ATSIM replaces the traditional methods and provides an automated and affordable alternative to collection and analysis of transit stop inventory. The availability of ATSIM also avoids duplication of development effort by multiple agencies and contributes to the standardization of transit stop inventory in Florida.

**Technical Support**

For technical support or additional information, please contact the developer through one of the following three channels:

- Email your request to gana@fiu.edu (preferred).
- Call (305) 348-3116 for Albert Gan.
- Send to: Albert Gan  
  Lehman Center for Transportation Research  
  Florida International University  
  10555 West Flagler Street, EC 3680  
  Miami, Florida 33174

For the latest information on ATSIM, please visit http://letr.eng.fiu.edu/ATSIM.htm.
Standard ATSIM Attributes

Why Standard Attributes?

Currently, transit stop inventories are developed separately by each transit agency and do not share the same data structure, attributes, accuracy, coordinate system, software platform, etc. A standard transit stop inventory will allow the FDOT to effectively develop customized tools that can be used by all agencies.

What are the Standard Attributes?

The standard attributes in ATSIM were identified based on both an agency survey and a review of existing transit stop databases from agencies in Florida. The agency survey was conducted during the first quarter of 2004 to obtain information on the state-of-the-practice in transit stop inventories. The survey was sent to all 25 Florida transit agencies with fixed route services. A total of 16 systems responded to the survey, yielding a 66% response rate. The survey included a total of 13 questions on inventory collection methods used, desirable transit stop attributes, transit stop data applications, transit stop data maintenance, and transit stop data utilization.

The Florida transit stop inventory includes a total of 36 standard attributes in addition to six attributes that can be defined to meet specific needs. The 36 standard attributes assure that Florida’s transit systems will have, at a minimum, these attributes and with the same consistent definitions.

General Attribute

1. Assessor: The name of the person who performs the field data collection. The system will keep any name entered until a new name is specified.
Location Attributes

1. Stop Number: A unique identifier assigned to the transit stop. It is common for agencies to put this number on the stop sign.

2. Routes: All route numbers served by the stop (enter each route number separated by a comma).

3. Travel Dir: The direction of the street on which the stop is found. They can be EB (eastbound), EB (westbound), NB (northbound), or SB (southbound).

4. Distance to At-Street: Distance to the cross street in feet. If a measuring wheel is not used, this can be a distance approximated by the assessor (accurate to the nearest 5 or 10 feet should be sufficient).

5. On-Street: The name of the street along the transit route. A list of all possible street names for all transit agencies in Florida is stored in the ATSIM system. Within the data entry field, as soon as part of a street name is typed in, up to five street names (any part of the name) that match the tapped-in portion of the street name will be displayed on screen for selection. Identify and select the correct street name from the list and then go to the next field. Tab in the complete street name from the screen keyboard a street name is not found on the list.

6. At-Street: The name of the closest cross street to the stop location. As in the case of on-street name, a list of all possible street names is stored in the ATSIM system and up to six street names that match the entered string characters will be listed for selection.

7. Placement: The stop location in relative to the cross-street. It can be “far” for far-side stop, “near” for near-side stop, “middle” for mid-block stop, or a “terminal”. The determination of whether a stop is far- or near-side is in reference to its nearest intersection. It is suggested that a stop be considered mid-block if it is located more than about 200 feet from its nearest intersection.

8. Status: “Active” if the transit stop is currently being used or “inactive” if it is not.

9. Landmark: The major landmark served by the transit stop, if one exists.

10. Latitude and Longitude: These are the real-time latitude and longitude locations. The numbers are automatically filled in from the built-in GPS receiver.

Amenity Attributes

11. Transit stop amenities: The following 15 amenities are included: shelter, bench, advertisement, trash can, schedule, map, newspaper, lighting, bike rack, vending
machine, restroom, nearby phone, parking, electronic message, and info kiosk. For shelters and benches, the number of each is entered. For advertisement, one of the following options can be selected: on bench, on shelter, on both, and no advertisements. If there are no shelters or benches, “0” should be entered. For the other amenities, because they are less common and usually have only one unit (if one is present at all), only the presence of each is recorded with a check mark. This allows the attributes to be collected more quickly. The default is that the amenity is not present.

**Miscellaneous Other Attributes**

12. Sidewalk: Three levels of sidewalk conditions can be entered: no sidewalk, 5-foot or wider sidewalk, and below 5-foot sidewalk.

13. ADA: Three levels of ADA accessibility are used: accessible, functional, and not accessible. A transit stop is considered accessible when it can be accessed by persons in wheelchair. A functional stop can be accessed by persons in wheelchair, but they are not in full compliance with ADA regulations. A stop is considered inaccessible if it cannot be reached by persons in wheelchair.

14. Curb cut: Check if there are ramps to allow people with wheelchairs to get to the transit stop.

15. Loading pad: Check if there is a loading pad to load people in wheelchair.

16. Obstructions: Check if there are obstructions that will prevent people in wheelchair from accessing the transit stop, including obstructions in any access directions.

17. Bay: Check if there is a transit bay, usually a bus bay.

18. Bike Lane: Check if there is a bike lane in front of the transit stop.

19. Trees: Check if there are trees beside the transit stop.

20. Stop Sign: Check if there is a transit stop sign.

21. Sign not Clear: Check if the information on the transit stop sign has become difficult to read.

22. Post Type: The type of post to hold the transit stop sign. It can be a dedicated post used exclusively for the stop sign, a utility pole, or any other poles.

23. Others: A “note” is included for the assessor to note any special conditions that exist at the stop. In addition, a total of six user-defined attributes are included: two for entering specific information and four for recording if a feature is present. The agency can define what each variable represents.
Installing ATSIM

The complete application of ATSIM requires the installation of two install packages:

1. The ATSIM field data collection system, to be installed on the PDA; and
2. The Florida Transit Information System (FTIS), to be installed on a desktop (or laptop) computer.

Installing ATSIM Field Data Collection System

To install the ATSIM field data collection system, insert the ATSIM Install Disk and then access the CD-ROM drive using Windows’ Explore. As shown in the screen below, there are a total of five setup programs to be installed in sequence. Double-click a setup file to start installing. The first setup program will install to your desktop or laptop computer and the next four will each install to your PDA. You may skip any of the first four setups if you are certain that it has been installed on your PDA.
Note: While installing Setup2 to Setup5 (i.e., Step 3 to Step 6 below), you may be prompted the following warning message on your PDA screen. Tap ok to ignore the message.

Follow the following six steps to complete your installation:

Step 1: Run Setup1.exe to install Microsoft ActiveSync on your Desktop. If necessary, the following website contains a step-by-step demonstration of the installation process:

Caution: Do not connect your PDA cradle to the computer until you have finished installing ActiveSync.

If you are prompted the following screen, select USB and click Next:

Step 2: Connect your PDA cradle to your computer. Depending on your computer environment, you may be prompted the following screen or something similar:
Select “Guest partnership” and click Next to continue. You will be prompted the following screen:
**Step 3:** Run `Setup2.exe` to install Microsoft .NET Compact Framework. You will be prompted the following screen. Click Next to continue.

Click Yes when prompted the following screen:

Click OK when prompted the following screen:
SECTION 3

INSTALLING ATSIM

**Step 4**: Run Setup3.exe to install Microsoft Adoce CE 3.1. Refer to Step 3 when prompted the same screens.

**Step 5**: Run Setup4.exe to install Microsoft SQL CE 2.0. Refer to Step 3 when prompted the same screens.

**Step 6**: Run Setup5.exe to install the ATSIM field data collection system. Unlike Steps 3 to 5, click No when prompted the following screen:

![Installing Applications]

The following screen will pop up to allow you to specify where you want to install your ATSIM application to. Select SD Card and click OK.

![Select Destination]

**Installing Florida Transit Information System (FTIS)**

FTIS is distributed via both a CD-ROM and website download. The CD-ROM version is available free of charge to all state and local agencies in Florida, plus firms under contract to these agencies. The website download version is available to the general public free of charge at the following URL upon user registration: [http://www.lctr.fiu.edu/ftis](http://www.lctr.fiu.edu/ftis).

To install FTIS, insert your FTIS CD and wait for a few seconds for the FTIS install to automatically start the FTIS setup program. Follow the instructions on the screen to complete the installation.
Running ATSIM Field Collection System

Once the ATSIM field data collection system is successfully set up in your PDA, you are ready to apply it in the field. This section describes the steps to access and navigate the system in the Windows CE environment.

Accessing the System

When you turn on your PDA, you will be greeted with the screen shown in Figure 6-1. Tap the Start menu and select Programs to bring up the screen shown in Figure 6-2. Tap the ATSIM icon to enter the program.

Figure 4-1. Windows CE “Today” Screen
Entering and Editing Field Data

After you have tapped the ATSIM icon, it will take a few seconds to enter the first screen of the ATSIM application program, which is shown in Figure 4-3.

This screen allows you to specify the following input:

- The name of the assessor. This field is required. As soon as the field is tapped, a screen keyboard will appear for you to enter your name. You may remove the screen keyboard by tapping the keyboard icon located at the bottom-right corner of the screen. Once a name is entered, it will be automatically loaded until another name is entered.
The database file to store the transit stop attributes. You may choose to open a new database or an existing database. Selecting to open a file will bring up the screen shown in Figure 4-4, which allows you to choose a database file to open. Do not open an existing database that has been transfer to your project folder in your desktop or laptop computer. Doing so may result in duplicated stop records in the combined database (see Step 1 of Section 5 for more information).

Figure 4-4. Screen for Specifying an Existing Database File to Open

The Folder for Photos box lists the default folder in which the photo files are stored (this field is for information only and cannot be edited). ATSIM will fetch the photo files from this folder to the external memory card where there is more storage space for large files. ATSIM will not be able to find the photo files if this folder is changed (when you are in the Photosmart program).

Select your transit system. This will tell ATSIM to load the street names in your transit service area and facilitate the street name entries.

The line at the bottom of the screen shows you the status of the GPS connection. When you are in a location reachable by GPS signal, the connection may take a few seconds to a few minutes to connect. If you tap the Continue button without waiting for the GPS connection to complete, you will get a warning message shown in Figure 4-5, which informs you that your attribute records will not contain any GPS coordinates if you choose to proceed without the GPS connection (which is not desirable in an actual field data collection).
When the GPS is connected, the screen will indicate “**GPS Connection is OK**”. Tap the **Continue** button to enter the first ATSIM screen shown in Figure 4-6. The first screen is for entering data related to location attributes. The screens for the other four tabs are shown in Figures 4-7 to 4-10, respectively, for various attributes associated with each transit stop.
### SECTION 4  
**RUNNING ATSIM FIELD COLLECTION SYSTEM**

### Figure 4-7. Data Entry Tab for Location Amenities

<table>
<thead>
<tr>
<th>Location</th>
<th>Amenities</th>
<th>Misc</th>
<th>Other</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shelter:</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ad:</td>
<td>On both</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Trash Can</td>
<td></td>
</tr>
<tr>
<td>Schedule</td>
<td></td>
<td>Map</td>
<td>Newspaper</td>
<td></td>
</tr>
<tr>
<td>Lighting</td>
<td></td>
<td></td>
<td>Bike Rack</td>
<td></td>
</tr>
<tr>
<td>Vending Machine</td>
<td></td>
<td></td>
<td>Restroom</td>
<td></td>
</tr>
<tr>
<td>Nearby Phone</td>
<td></td>
<td>Parking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic Massage</td>
<td></td>
<td>Info Kiosk</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Figure 4-8. Data Entry Tab for ADA and Miscellaneous Other Attributes

<table>
<thead>
<tr>
<th>Location</th>
<th>Amenities</th>
<th>Misc</th>
<th>Other</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk:</td>
<td>5 feet or greater</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loading Pad</td>
<td>Obstructions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Curb Cut</td>
<td>ADA: Accessible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bike Lane</td>
<td>Bay</td>
<td>Trees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stop Sign</td>
<td>Sign Not Clear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Type:</td>
<td>Bus Stop Pole</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Figure 4-9. Data Entry Tab for User-Defined Attributes

<table>
<thead>
<tr>
<th>Location</th>
<th>Amenities</th>
<th>Misc</th>
<th>Other</th>
<th>Photo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other 1:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other 2:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other 3</td>
<td></td>
<td>Other 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other 5</td>
<td></td>
<td>Other 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15
The last tab (Figure 4-10) allows access to the Photosmart software. Tapping the Start button will open the screen shown in Figure 4-11. The screen shows buttons that allow you to zoom in, zoom out, toggle the flash light, and shot a photo (i.e., the largest button on screen). Wait for the green light before taking another photo. After finishing taking the photos for a stop, tap the “X” button to close the Photosmart screen. You can optionally tap the Preview button, which will bring up the screen shown in Figure 4-12. The screen allows you to preview one photo at a time. By default it will display the last photo taken. Use the Previous and Next navigation buttons at the bottom of the screen to select a specific photo to display. Tap the Delete button to delete the photo that is on display. Tap the Back button to exit this screen.
Figure 4-12. Photo Preview Screen

After you have entered all the attributes and taken all the photos, tap the Save button at the bottom of the screens (of Figures 4-6 to 4-9). To create a new record, tap the New button. To delete a record, use the Prev or Next button to go up or down one record to navigate to the target record and then tap the Del button.

Useful Tips

- To take better pictures with the camera, try to focus the square bracket area at the center of the camera screen on the main object for the picture (for example, a transit stop sign). Also, to avoid having to re-orient your pictures, always take the pictures in the orientation shown in Figure 4-11.

- To avoid long wait for GPS connection, you should download the Quick GPS Connection file every other day from its server location. To do this connect your PDA to a computer with the Internet connection, select Start|Settings and then tap the Connections tab shown in Figure 4-13. Tap the Quick GPS Connection icon to open the screen shown in Figure 4-14. Tap the Download Now button to download the file, which will be automatically installed.
Figure 4-13. Start\Settings Screen

Figure 4-14. Screen for Downloading the Quick GPS Connection File
Post-Processing Field Data

This section covers the process of transferring field data from the PDA to a desktop computer and merging of field data, including both attribute data and digital pictures collected from different data collection sessions. The Florida Transit Geographic Information System (FTGIS) is used as the GIS platform for these applications.

FTGIS is a system component of the Florida Transit Information System (FTIS)—a user-friendly software system designed specifically for transit planning applications in Florida. As a stand-alone GIS system, FTGIS comes with ready-to-use GIS shape files for Florida’s fixed-route transit systems as well as many easy-to-use, customized GIS functions and applications. For detailed information on FTIS and FTGIS, refer to the FTIS User’s Guide or visit the FTIS homepage at: http://www.lctr.fiu.edu/ftis.

Step 1: Transferring Field Data from PDA to Desktop

After returning from the field, you may decide to transfer your field data from the PDA to a desktop computer that is hosting your ATSIM project. Both your attribute data and picture files are stored in the PDA in a database folder that carries the same name as your database file (see Database File in Figure 4-3). Within the folder, there is a “cdb” database file and a subfolder that is used to store all the corresponding picture files. To transfer both the attribute and the picture files, you simply need to copy the folder and then paste it to a project folder in your desktop.

Note: During the file transfer from the PDA to your desktop computer, your “cdb” database file will be automatically converted to an “mdb” Microsoft Access file. For this conversion to work, your desktop must be installed with Microsoft Access.

Assuming your data folder is called sample, follow the following steps to transfer your data folder from your PDA to your desktop computer:

1. Open My Computer on your desktop computer.

2. Double click the Mobile Device drive.
3. Double click the **My Pocket PC** folder.

4. Double click the **SD Card** folder.

5. Right click the data folder you want to copy and select **Copy**.

6. Double click the **Local Disk (C:)** drive.

7. Double click **ATSIM Projects** folder and select **Paste**. The screen below will pop up:

![Export from Mobile Device Dialog Box]

8. Click the **Browse** button to bring up the screen below. In this screen, select the **C:\ATSIM Projects\sample** folder and then enter **sample** as the filename. Click the **Save** button to close and return to the screen shown in the next step.
9. The file path should be the same as shown in the screen below. **Note that database filename must be the same as the data folder name.** Uncheck the two checkboxes at the bottom and click **OK** to start the database conversion.
10. The following screen will pop-up. Click **Yes to All**.

Step 2: Merging Data, Link Pictures, and Create Shape Files

This step allows you to combine the data files, link pictures to their corresponding stops, and create a shape files containing all the stop attributes and the links to pictures. The function to perform all of these three tasks can be accessed by selecting the **Applications|Florida Standards Transit Stop Inventory|Merge Transit Stop Data** menu option. This will bring up the screen below:
In this screen, first select the drive and then select the folder that you have copied your data folder to. By default, C:\ATSIM Projects is selected. The figure shows that under the Example project, there are two data folders from two different data collection sessions. To select both data folders in the Example project, click Example and then click the Add button. To select one of the two data folders, click the desired subfolder and click Add. All selected folders will be shown on the right side of the screen. To remove a selected folder, click the selected item and then click the Delete button. At the bottom of the screen, specify the name of the output shape files and then click the Merge button to start the merging process. Depending on the size of the data files, this may take up to several minutes to complete.

The figure below shows an example report that summarizes the results from the merging process. The report gives the total number of attribute records (i.e., number of stops) and the total number of pictures merged. The report also gives the numbers and percentages of stops with zero, one, and two and more pictures merged. You can select to list the transit stops that have a certain number of pictures successfully merged by clicking the appropriate radio buttons. Click Save to save a list of transit stops shown on the screen to a file.
After transit stop pictures are merged with the database, the complete transit stop inventory together with the merged pictures will be automatically stored under the folder for the transit system from which the merging function was accessed. For example, if the merging function was accessed when the user is working on the PalmTran transit system, the newly created files will be automatically saved to the folder for PalmTran. For FTIS version 2005, the default path for this would be C:\FTIS 2005\FTGIS\GISFiles\palmbech. The newly created transit stop inventory can then be used for various applications, some of which are developed as part of this project and are described below.
Applying ATSIM Data

This section presents some GIS application functions designed to apply the shape files created in the previous section using the FTGIS as the GIS platform.

Retrieving Transit Stop Attributes and Pictures

A basic need of transit agency for transit stop information is to be able to find out quickly the conditions at a transit stop and its surrounding area. FTGIS provides a function to allow you to quickly retrieve all the attribute information of a transit stop. To apply this function, the transit stop layer must be made visible and be defined as the current layer. These are done by checking the corresponding checkbox and clicking on the layer name in the map legend. An example is given in Figure 6-1 for the R1_STOPS.SHP map layer, which contains a transit stop inventory that was collected as part of a field test of the ATSIM system.

![Figure 6-1. FTGIS Map Screen and Legend](image)

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To retrieve data for a specific transit stop, select the **Applications|Florida Standards Transit Stop Inventory|View Transit Stop Attributes and Pictures** menu option. The system will detect if the current layer is based on the Florida standard transit stop data structure. If it is not, you will be reminded of this requirement. If the requirement is met, the mouse cursor will change to one that combines the standard mouse pointer with a question mark. Clicking on a transit stop feature (i.e., a dot) on the map will retrieve and display the transit stop data. A sample output of this function is shown in Figure 6-2, which lists transit stop attribute data side-by-side with pictures. In this screen, you may:

- Scroll down the screen to reveal hidden output data.
- Click the tool button to print the screen.
- Click a picture to get an enlarged version of the picture. A sample of an enlarged picture is shown in Figure 6-3.

![Figure 6-2. Retrieved Transit Stop Attribute Data and Pictures](image-url)
Querying Transit Stop Inventory

FTGIS includes a query function to allow you to quickly identify transit stops that possess a specific set of features. The function is accessible by selecting the Applications|Florida Standards Transit Stop Inventory|Query Transit Stop Database menu option. Selecting this menu option will bring up the screen shown in Figure 6-4, which by default will display query specifications for location attributes. Similarly, Figure 6-5 shows those attributes related to transit stop amenities and Figure 6-6 includes ADA and miscellaneous other attributes.
Figure 6-4. Query Filters for Location Attributes

Figure 6-5. Query Filters for Amenity Attributes
Specifications for these attributes act as filters to retrieve only those transit stops that met the specified attribute option(s). In applying these filters, the following rules apply:

- Specific query conditions are specified by keying in the specifications, selecting an option from the dropdown menu, or clicking on a check box.
- By default, the attributes are left unspecified, i.e., unused. No filters will be applied based on these attributes as a result.
- Multiple query conditions may be specified on one or more tabs.
- When multiple options are specified for an attribute, the “or” logical operator is applied. For example, when “SB” and “NB” are selected for route directions, the query will return transit stops in the southbound direction plus those in the northbound direction.
- When filter options are specified for more than one attribute, the “and” logical operator is applied. For example, checking Advertisement and Trash Can under the Amenities tab will cause the query to return only transit stops that have both advertisement and trash can.
• For query applications that require other combinations of “or” and “and” logical operators, the user should select the Tools|Select Features|By Query menu option, which allows one to construct general queries. Refer to the FTIS User’s Guide for instructions on this function.

Once the query specifications are completed, you can click the Apply button to execute the query. All transit stops that satisfy the query conditions will be listed on the list box below the tabs. You may then select any one transit stop on the list by clicking on the appropriate list item and then apply one of the following functions:

1. Click the Save button to save the listed stops as either an Excel file or a Shape file. A newly created Shape file will automatically be listed on the legend, unless you have specified to save to another folder other than the default folder.

2. Click the Highlight button to blink the selected transit stop.

3. Click the Pan To button to position the selected transit stop at the center of the screen.

4. Click the Zoom To button to zoom into the selected transit stop.

**Visualizing Transit Stop Summary**

FTGIS includes a summary function to allow you to quickly obtain the number and percentage breakdowns of each attribute option. For example, one can quickly find out the percentage of transit stops that are ADA accessible. The statistics can be summarized for a specific route or any combinations of routes. This particular function is accessed by selecting the Applications|Florida Standards Transit Stop Inventory|Show Transit Stop Summaries menu option.

Figure 6-7 shows a screen that has four attributes selected. Attributes are selected by clicking the checkboxes on the Attributes list on the top-left corner. One or more routes may be selected. This is done by clicking the checkboxes on the Routes list right below the Attributes list. When multiple routes are selected, the summaries may be based on individual routes or all route combined. This option selection is given at the bottom left of the screen. Note that because of missing values (i.e., null cells), the percentages may not add up to 100%.

By default the system will display the tabulated summaries first. Summaries for different routes are displayed in different rows. Summaries for different attribute options for one or more attributes are displayed in different columns. When multiple attributes are selected, their attribute options will be displayed in sequence. The rows and columns may be swapped by clicking on the tool button. The tabulated summaries will give the number
of transit stops under each attribute option. Each number is accompanied by a percentage value that is shown in parentheses.

The same information displayed in table can be displayed by chart. Figure 6-8 shows such an example. The chart option is accessed by clicking the tool button. In the chart view, the chart type, line marker, and line width can be changed using the dropdown lists at the bottom of the plot. To return to the cross table view, simply click the tool button. Tabulated values and charts can be exported to an Excel file by clicking the tool button.
Figure 6-8. Output Transit Stop Summary Displayed by Chart
ATSIM Deployment Guidelines

This section provides procedural guidelines for field deployment of the automated transit stop data collection system developed in this project. A significant portion of the guidelines presented were based on lessons learned from a field test on transit stops on a major route for the PalmTran transit system. PalmTran was chosen mainly because of the high interest the agency expressed on this project as well as for its proximity to Florida International University. It is also the only transit agency in the Southeast Florida region that does not have GPS locations of transit stops. The major route selected for the field test was Route 1, which runs mainly along US Highway 1 and has about 450 bus stops at the time of data collection. PalmTran has planned for this to be a major corridor for implementation of Advanced Public Transportation Systems (APTS) technologies, which requires accurate bus stop data.

Data Collection Plan

Initial Field Survey

- Before the actual data are collected, it is important that an initial field survey be conducted to obtain field conditions and then design the data collection plan that best fit the field conditions.

- During this field survey, it is advisable that a digital camera be used to capture any special field conditions. These pictures can also be used for crew training, described later in this section.

Date and Time

- Transit stop inventories can be collected during the daylight hours on any day of the year.

- Data collection under rainy condition should be avoided to avoid water damage to the PDA.

- Data collection on weekends generally offers the benefit of faster data collection and better safety due to lighter traffic, especially at the usually busy intersections.
• For transit stops on congested roadway sections, it is desirable to schedule assignments such that they avoid these sections during the rush hours.

**Crew Assignment**

• The number of crew members to use depends on the available equipment and personnel. Larger agencies will obviously require more crew members so that the job can be completed within a reasonable time.

• Fewer crew members will take longer to complete, but the total cost of data collection may be reduced and the quality of data may be improved, as it gives time for the survey crew to become experienced.

**Mode of Travel**

• A passenger vehicle is the most convenient mode of transportation for traveling from one stop to another as it offers good travel speed, provides survey crew a refuge from rain and heat, allows recharging of equipment, shields survey crew from other vehicles, and provides a place to store items such as laptop, measuring wheel, food, water, garments, shoes, etc. A vehicle also allows the survey crew to quickly travel to a new survey location and to and from restaurants, restrooms, hotels, etc.

• For the safety of both the survey crew and the general traveling public, the survey vehicle should not block a travel lane during data collection, even if the blockage is only partially and/or for only a short period of time.

• A pick-up truck is the preferable type of vehicle, as it offers the height and power needed to go onto a curb when necessary. Agencies should check with the local jurisdictions to determine if temporary parking on curb is allowed. Figure 7-1 shows a pick-up truck parked on a sidewalk area.

• A motorcycle offers the same speed as a vehicle and it enjoys the convenience of easy parking. In areas where space for temporary parking is not available, a motorcycle could be a desirable alternative. Obviously, a motorcycle does not protect the survey crew from rain (which can ruin the collection system) or shield them from other vehicles.

• Bicycles and walking are two potential alternatives for areas with dense transit stop locations and/or with limited space for vehicle parking. They offer the same convenience as motorcycles and do not require the extra fuel cost. However, a major problem with these alternatives is that the survey crew will quickly become tired from prolong pedaling or walking, thus may shorten the number of work hours and reduce work productivity.
Figure 7-1. Survey Vehicle Parked on Curb/Sidewalk

Safety Accessories

- An emergency flashing light should be used to alert drivers and provide safety to the crew. The light should preferably be located on top of the vehicle and toward the side of the travel lane to increase visibility to other drivers. In addition, the emergency stop light of the survey vehicle should be turned on at all time during data collection. Figure 7-2 shows one such example.

Figure 7-2. Example Showing Emergency Flashing Light and Emergency Stop Lights
Due to frequent stops made by survey vehicle, a large display sign mounted on the back of the survey vehicle is desirable to alert motorists that there is a survey in progress.

Survey crew should wear an orange vest. This is not only for safety purposes, but also to hint customers waiting at transit stops that data are being collected for official purposes and to reduce the uneasiness of customers for having their pictures taken together at a transit stop.

**Miscellaneous Items**

- Each survey crew should carry a letter issued by the transit agency. The letter should be in the agency letterhead and include the data collection period, the contact person at the agency, and the purpose of data collection effort.
- Bottled water, snacks, and other food items may be carried in the vehicle.
- Hat and sun glasses are desired on sunny days.
- Unless it is desirable to obtain an accurate distance of stop location from the nearest intersection, a measuring wheel is not needed. Estimates based on “eye measurement” should generally be sufficient.

**Crew Training**

- Crew training is important to ensure that all crew members are familiar with both the operations of the equipment and the data collection procedure.
- Trainer should explain each attribute, preferably with examples and pictures of different actual transit stops, to illustrate specific attribute options.
- Potential problems that may be encountered in the field should be pointed out during the training session.
- The training session should include a field test to collect data from several bus stop locations. A follow-up session right after the field test should be conducted to share questions and answers among the survey crews.

**Data Collection Procedure**

**Equipment Setup**

- Refer to Sections 2 and 4 on how to install and operate the transit stop data collection
software application.

- The survey crew must check all equipment to make sure they function properly before each trip to the field.

**Pictures**

- Pictures of transit stops are optional data for a transit stop inventory.

- If an agency desires to collect pictures of transit stops, it is recommended that three pictures be taken at each stop. The first includes a close-up view of the transit stop sign, which usually displays route information and sometimes transit stop number. A second can provide a clear view of the transit stop amenities that are easily identifiable. A third can provide a broader view of the transit stop surrounding area.

- Front views of transit stops that may require the survey crew to cross the street is both time-consuming (waiting for traffic to clear) and a safety hazard and should be avoided.

**Batteries**

- The survey crew should make sure that the battery of the PDA is fully charged before going out in the field. On the PDA desktop, tap the “cylinder” shape icon near the bottom of the screen to bring up the screen shown in Figure 7-3 to check the levels of batteries. It is important to make sure that the “Backup Battery” is not exhausted. When this is exhausted, it will cause memory loss and all the programs installed on the PDA must be reinstalled again.

![Figure 7-3. Screen for Checking the Battery Levels](image)

- Depending on the battery charging capacity, a fully charged battery may last between four to eight hours of continuous/active usage. When a survey vehicle is not used and an
extra battery is not available, it is preferable to have the battery recharged between shifts, such as over the lunch time break in a restaurant. It should take about one to 1.5 hours to fully recharge an empty battery. The survey crew should make sure the restaurant they dine in allows for the recharging of equipment. Most fast-food places do not provide electrical outlets.

- A spare battery is desirable to avoid work interruptions due to low battery.
- The PDA should be re-charged after each data collection

**Data Quality Assurance**

- To ensure quality of data, quality assurance (QA) needs to be performed. Field verification of a randomly selected set of transit stops from different survey crew members from different areas and different days should be conducted.

- The sample size can be reduced over the data collection period. Field verification for the first few days is especially important since it will help to correct any problems early on.

- Data quality deemed unacceptable should be redone.

- If pictures are collected, a final verification of random samples can be performed by matching what are observed on the pictures to what are recorded for particular stops.

**Post Processing**

- After each day of data collection, data should be transferred to a project folder on a desktop or laptop.

- Even if storage spaces on both PDA and camera are sufficient for another shift, it is advisable that data are downloaded after each shift to prevent any data loss.

- At least one backup copy of all data collected should be made and stored in a separate location outside of the office building that houses the computer.
## HP iPAQ hw 6515 System Specifications

### HP iPAQ hw6515 Pocket PC with Cingular

- Starting price: $599.99
- Intel PXA272 processor (312MHz)
- Windows Mobile 2003 for Pocket PC, Phone Edition
- 64MB SDRAM, 64MB Flash ROM
- Bluetooth wireless technology, integrated quad band GSM/GPRS/EDGE, IrDA, USB
- 3" transreflective TFT screen with LED backlight
- SD slot and mini-SD slot
- 1200 mAh battery
- Cingular wireless phone service capable
- One-year limited warranty
- Integrated GPS receiver

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<th>Operating systems installed</th>
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<td>Processor</td>
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<tr>
<td>Input type</td>
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<tr>
<td>Audio</td>
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<td>Dimensions (L x W x H)</td>
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<td>Weight</td>
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<td>Warranty, std.</td>
<td>One-year parts and labor; 90 days technical support for software. Warranty and support provided by Cingular Customer Service at 1-866-CINGULAR (1-866-246-4852) or dial 611 from your iPAQ hw6500 Mobile Messenger Series</td>
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<td>Software included on CD</td>
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</tr>
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<td>Software included with product (on ROM)</td>
<td>Pocket versions of Microsoft® software (Outlook, Word, Excel, and Internet Explorer for Pocket PC). Microsoft® Windows Mobile 2003 software (Phone Edition), Calendar, Contacts, Tasks, Voice Recorder, Notes, Pocket Word (with Spellchecker), Pocket Excel, Pocket Internet Explorer, Windows Media Player 10 (MP3, audio and video streaming), Calculator, Solitaire, Jawbreaker, Inbox (with Spellchecker for email), File Explorer, Terminal Services Client, VPN Client, Infrared Beaming, Clock, Align Screen, Memory, Volume control. HP Exclusive: GSM/GPRS Settings Manager, HP Photosmart Camera (hw6515), HP Image Zone for Pocket PC, iPAQ Wireless, HP Profiles, MMS Composer, Bluetooth Manager, iPAQ File Store, iPAQ Backup, Pocket Panel Lite, HP Image Transfer, Utilities (Self Test, iPAQ Audio, Power Status).</td>
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