

TerraFly Help

Table of Contents

| | |
|--|----|
| Introduction | 2 |
| Navigation Features..... | 2 |
| The Flight Control Window | 3 |
| Smooth Flight | 3 |
| Step-by-Step Flying Tutorial Via the Compass Control..... | 5 |
| Go-To Features..... | 9 |
| Step-by-Step Go-To Place Tutorial or..... | 11 |
| Step-by-Step Go-To Street Address Tutorial..... | 16 |
| Other features | 19 |
| The FlyFrame Windows | 20 |
| Smooth Flight | 21 |
| Step-by-Step Flying Tutorial | 21 |
| Changing Data Types and Resolution | 24 |
| Step-by-Step Tutorial for Changing Data Type and Resolution or | 25 |
| Data Manipulation..... | 29 |
| Dispenser Features..... | 30 |
| Step-by-Step Tutorial for Dispensing Data or | 32 |
| Look-up Features..... | 38 |
| Data Overlay and Filters..... | 39 |

Introduction

TerraFly is your interactive vehicle for flying over remotely sensed data. TerraFly runs on any standard browser such as Internet Explorer (version 4.0 or newer) and Netscape (version 4.06 and newer).

TerraFly is designed as a tool for navigating and manipulating virtually any type of remotely sensed data, making this data available to the average user over the internet. The data that is currently available on-line is: USGS Aerial Photography for Miami-Dade County, FL, Expedia Maps for Central and South Florida, LandsatNV (natural view) for the state of Florida and multi-spectral Landsat for the State of Florida. Other data will soon be made available.

This help is designed to get you 'flying' in TerraFly quickly and easily. This page provides brief descriptions of TerraFly's functionality to help you get started. If you would like more detailed instructions, step-by-step and animated tutorials are available for TerraFly's major functions.

Navigation Features

When TerraFly is first launched, 3 (or more) separate frames appear:

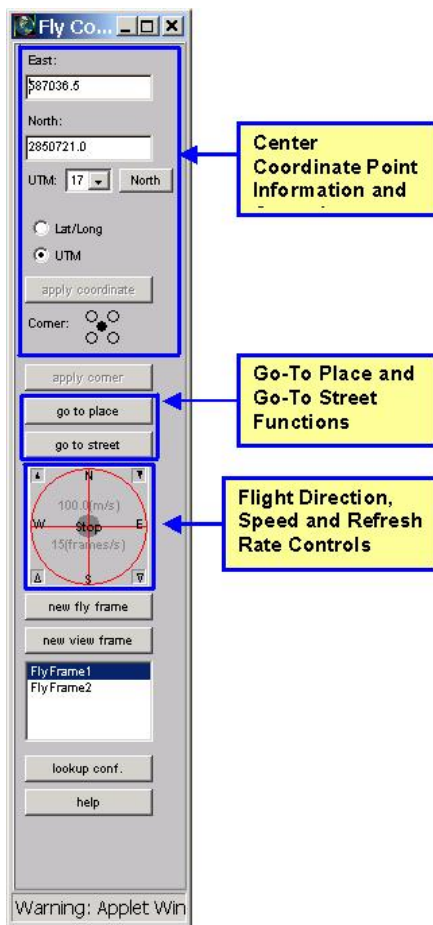
- 1) **Flight Control** - provides flight controls and information
- 2) **FlyFrame1** - contains remotely sensed data imagery
- 3) **FlyFrame2** - contains map data

There are a number of ways to navigate in TerraFly. One can 'fly' over the data or retrieve data directly via a geographic coordinate, place name or street address. These

two types of navigation are best accomplished using the Flight Control Window, although flight can be accomplished in the FlyFrames alone.

The other type of navigation is through different types and resolutions of data. This is accomplished using the drop-down menus in the FlyFrames.

The Flight Control Window



As can be seen here, the Flight Control Window has 3 main control areas:

- (1) Center Coordinate Information and Control,
- (2) Go-To Place and Go-To Street functions, and
- (3) Flight Direction, Speed and Refresh Rate Controls.

Smooth Flight

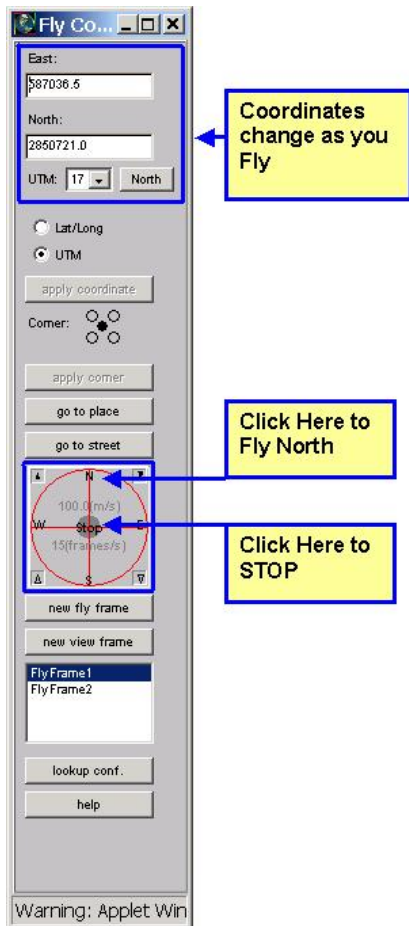
The Flight Direction, Speed and Refresh Rate Controls (3) are used when continuous, smooth flight is desired. To 'Fly' smoothly, click on the associated desired

flight direction within the red compass circle. So, if you want to fly North, click on the N

found in the red compass circle. To stop, click in the center. You'll note that as you are flying, the reference point coordinates are automatically updated.

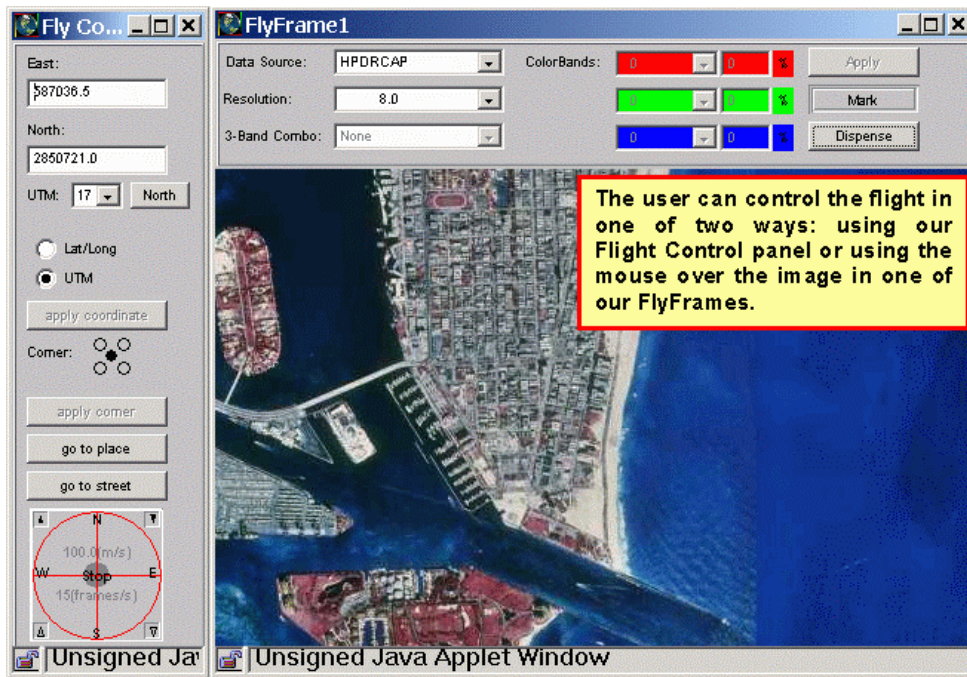
Flight speed and refresh rate can be adjusted using the two upper black arrows and two lower white arrows, respectively. To increase speed or refresh rate, click the respective up arrow. To decrease speed or refresh rate, click the respective down arrow. Speed is displayed in meters/second and the refresh rate is displayed in frames/second. Both refresh rate and speed adjustments can make flight smoother. Speed

should be adjusted to match the resolution of the data being displayed. For faster processor and Internet connections, the refresh rate should be increased.

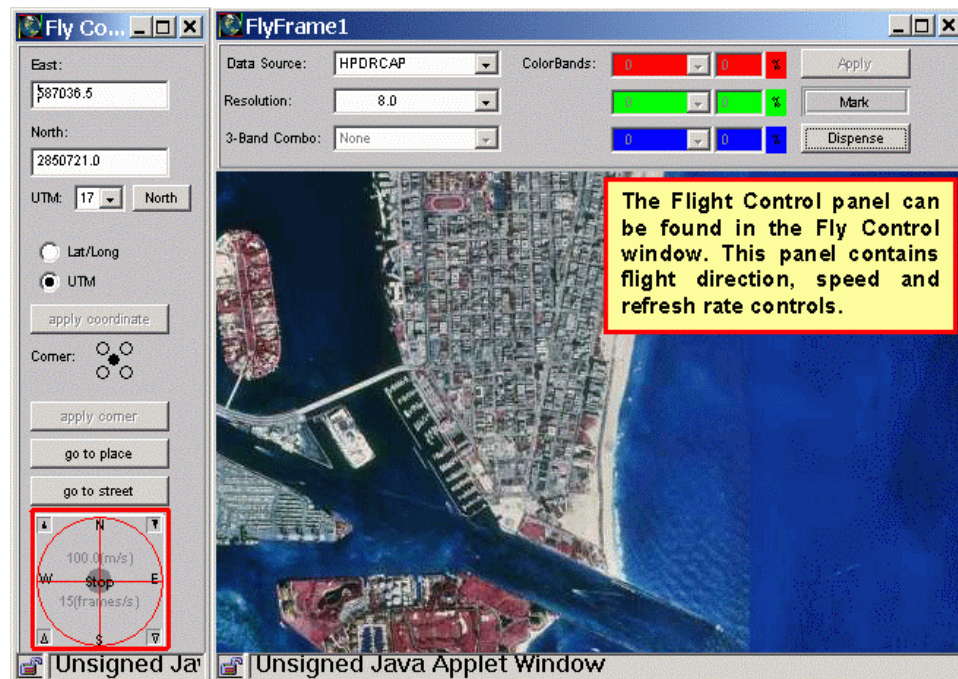


Step-by-Step Flying Tutorial Via the Compass Control

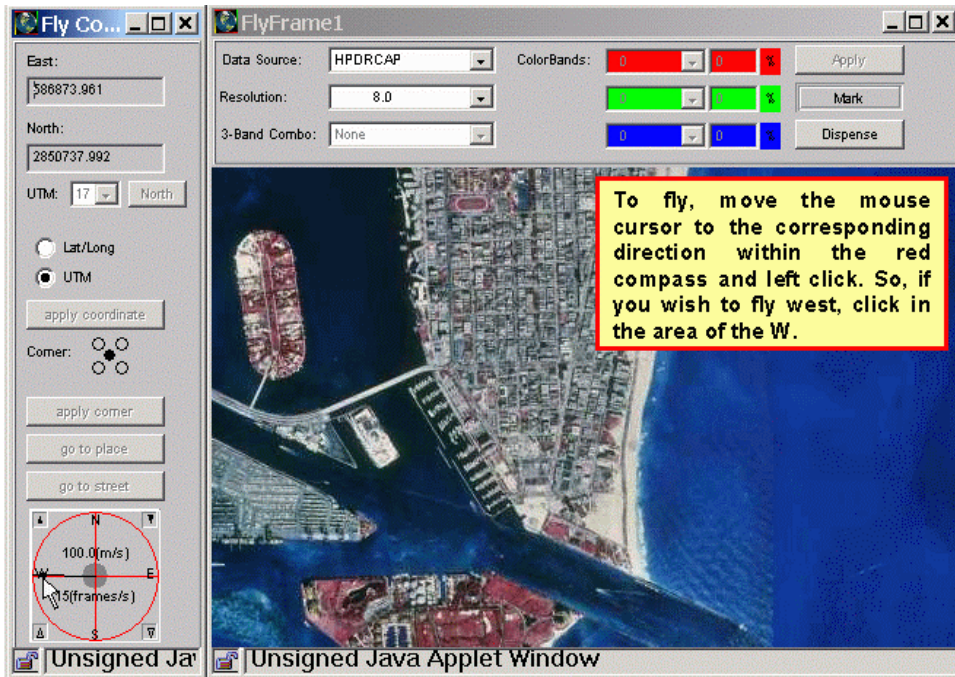
Step 1:



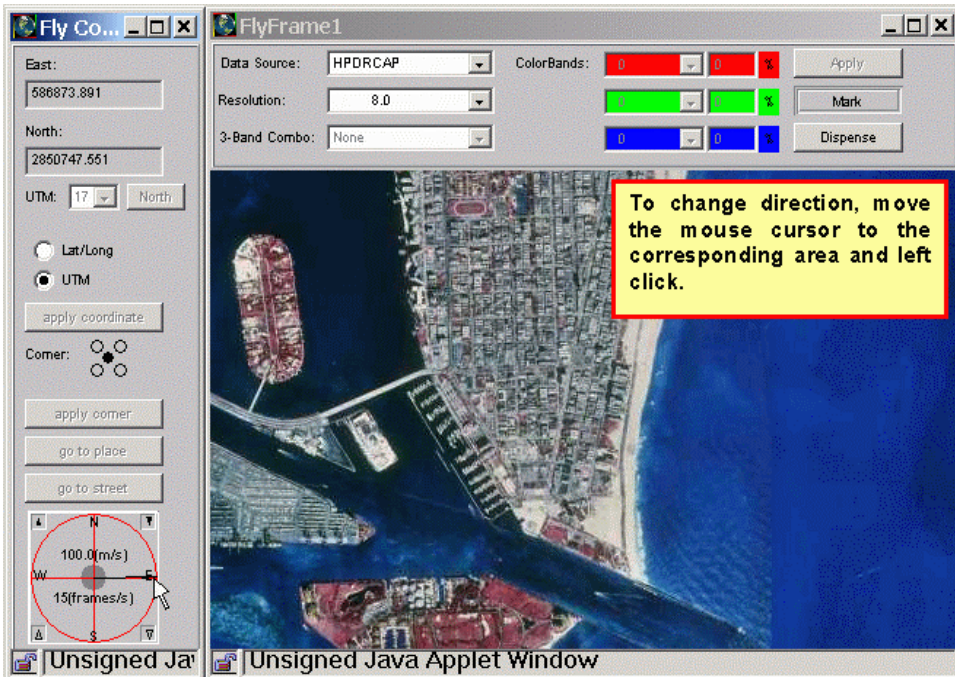
Step 2:



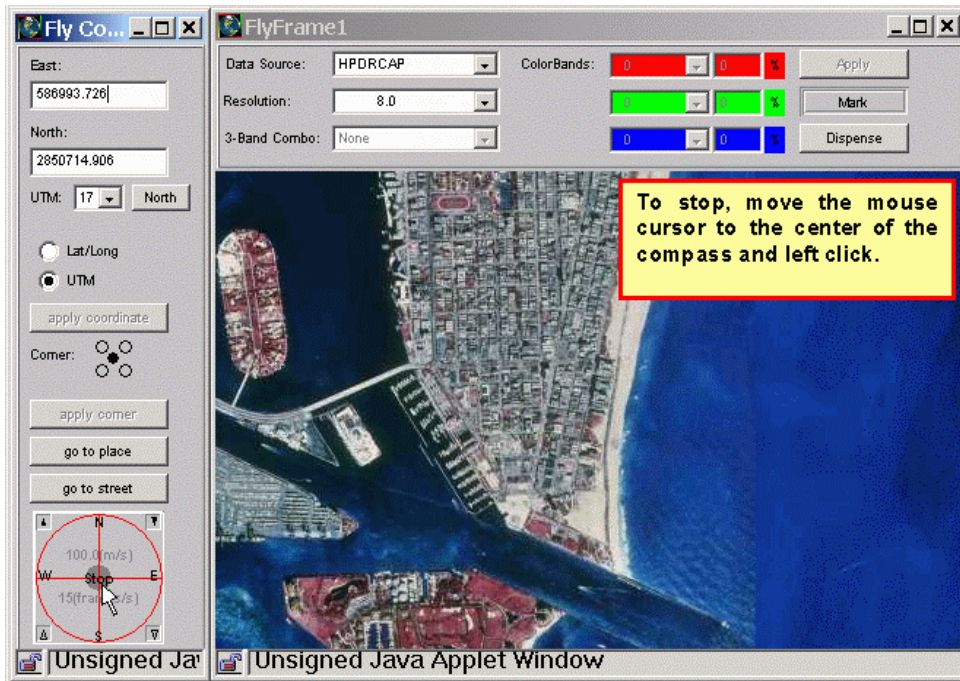
Step 3:



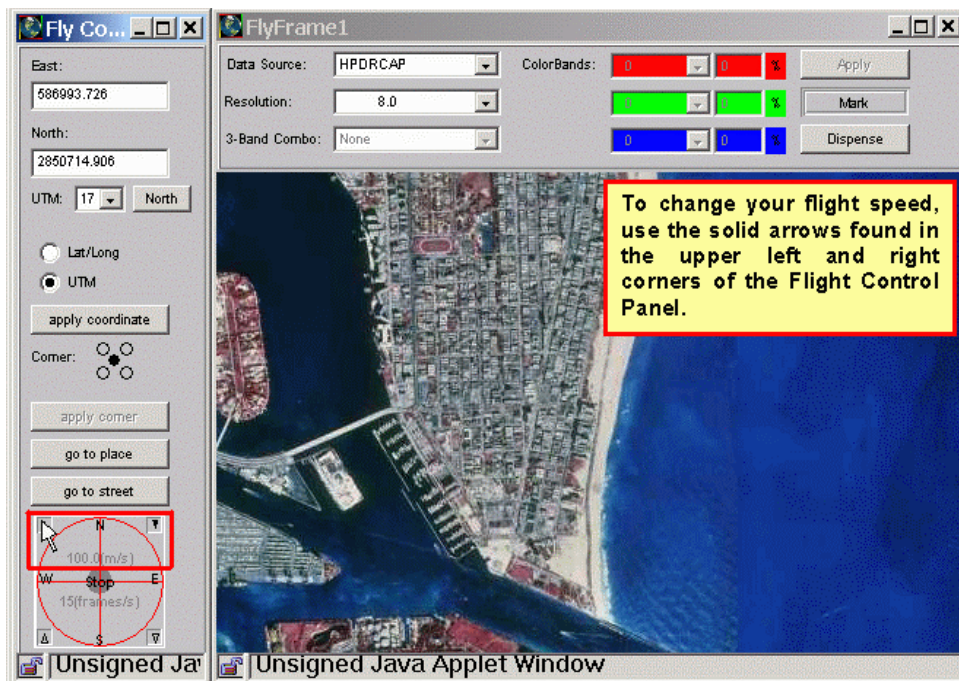
Step 4:



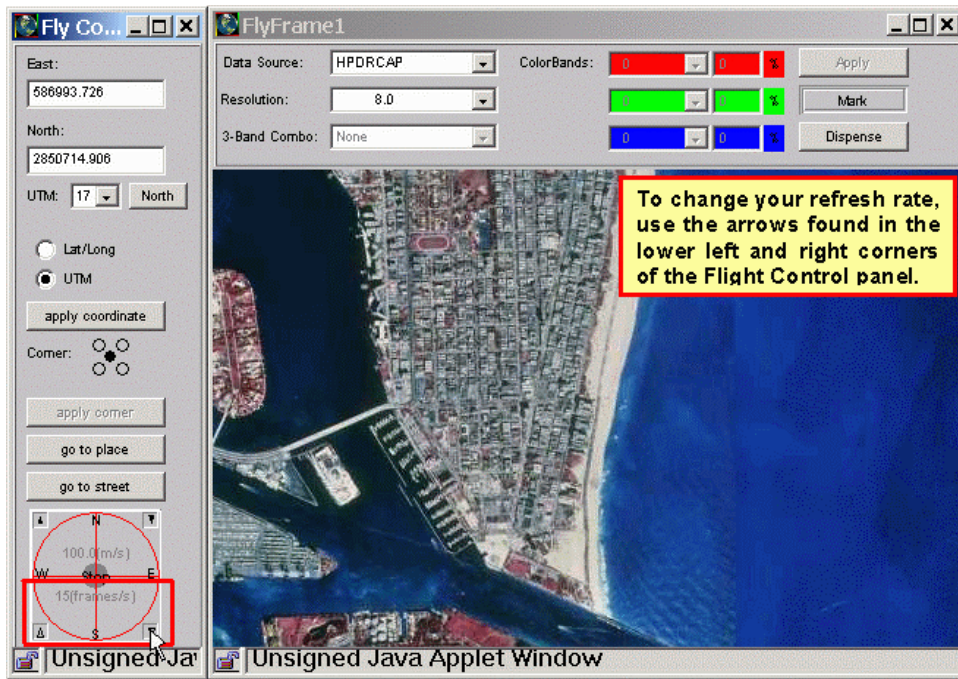
Step 5:



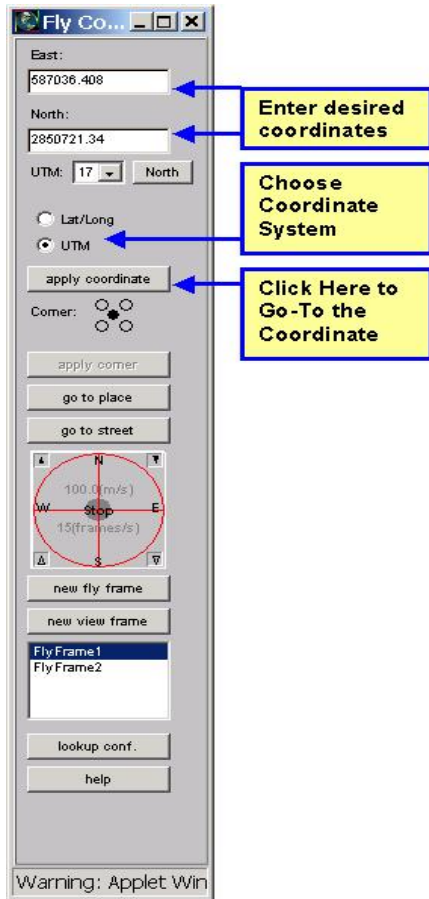
Step 6



Step 7



Go-To Features

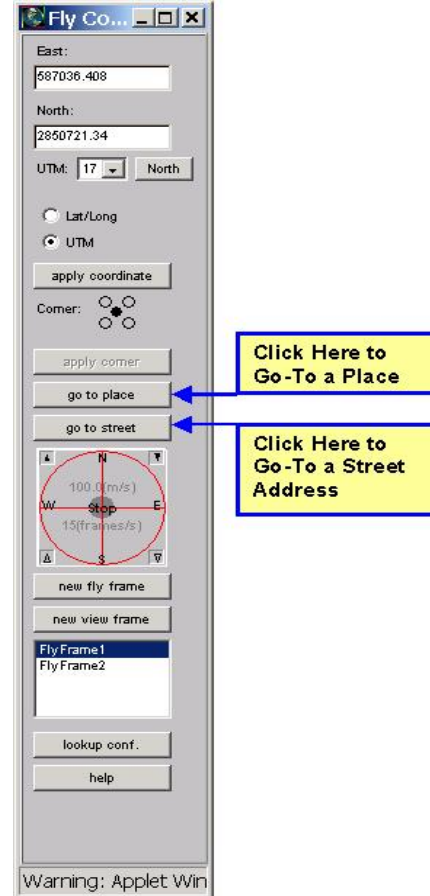


To go directly to an area of interest (i.e., directly load the data) via a geographic coordinate, place name or street address, the Go-To Coordinate/Center Coordinate Information and Control (3), Go-To Place and Go-To Street (2) are used, respectively.

To use the Go-To Coordinate function, enter the desired latitude/longitude or easting/northing UTM coordinate in the respective center coordinate textboxes and click on "apply coordinate".

The reference coordinate position allows the

user to change the position of the reference coordinate to one of the 4 corners of the image screen instead of using the default center position. To change the reference position, click on the associated circle and click "apply corner". This will shift the image so that the reference coordinate is now is the chosen position.



Go-To Place

To use the Go-To Place function, click on the "Go-To Place" button. This will open up another window, which contains the Go-To Place Query form. Through the use of drop-down menus and textboxes, you can query for the names and coordinates of places by place type (e.g., airport, school, beach, etc.), center point coordinate and distance from the center point, and the maximum number of results. After all of your choices are made, clicking the "Query" button returns a list of place query results. To go to a place on the list, click on its row and click "Ok".

The image shows two windows from the 'Go-To Place' application. The top window is the 'Query' form, and the bottom window is the 'Results' window.

Query Form (Top Window):

- Reference Coordinates:** Ref Longitude: -80.132, Ref Latitude: 25.772
- Place type drop-down menu:** Set to 'all'
- Search distance from reference coordinates:** Distance from: 100.0
- Maximum number of results:** Maximum Results: 50

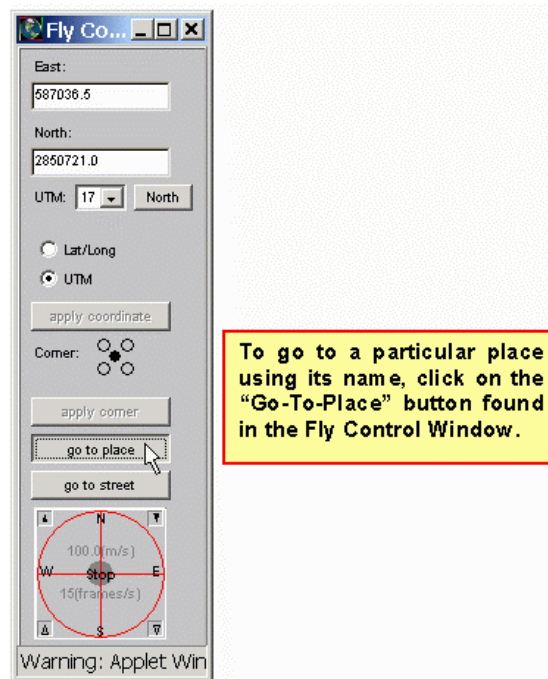
Results Window (Bottom Window):

The results window displays a table of search results. The table has columns for Longitude, Latitude, Distance, Placename, County, State, and Placetype. The results are sorted by distance from the reference coordinates.

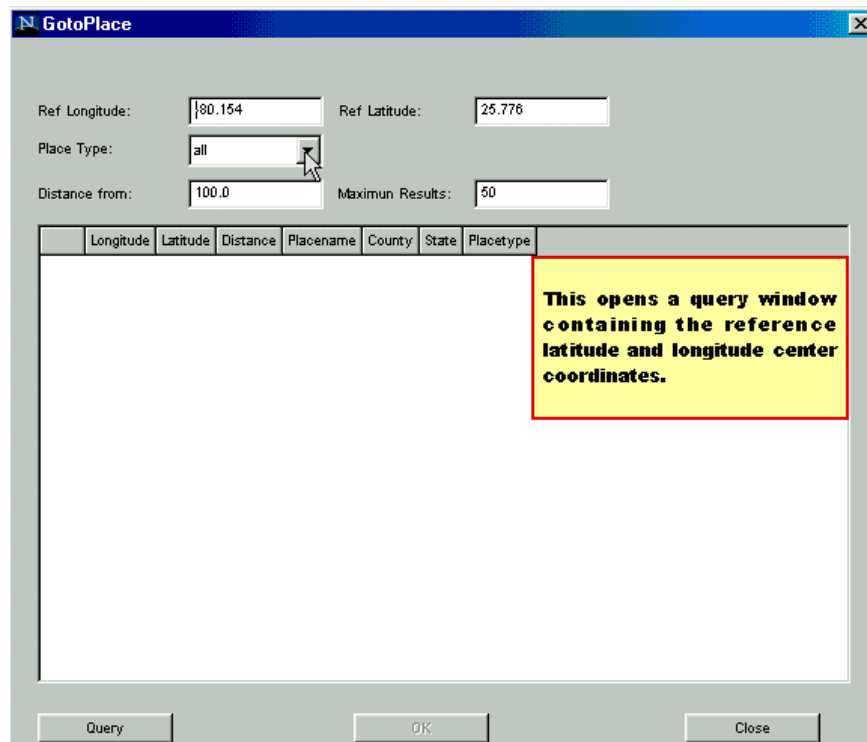
| | Longitude | Latitude | Distance | Placename | County | State | Placetype |
|----|-----------|----------|----------|---|------------|-------|-----------|
| 1 | 80.139 | 25.766 | 1.174 | Fisher Island Heliport | Miami-Dade | FL | airport |
| 2 | 80.175 | 25.775 | 2.377 | Watson Island International Seaplane Base | Miami-Dade | FL | airport |
| 3 | 80.179 | 25.785 | 2.739 | Miami Heliport | Miami-Dade | FL | airport |
| 4 | 80.141 | 25.816 | 3.051 | Emergency Heliport | Miami-Dade | FL | airport |
| 5 | 80.185 | 25.788 | 3.152 | Miami Herald Heliport | Miami-Dade | FL | airport |
| 6 | 80.192 | 25.772 | 3.305 | International Place Heliport | Miami-Dade | FL | airport |
| 7 | 80.198 | 25.778 | 3.697 | Miami International Airport | Miami-Dade | FL | airport |
| 8 | 80.121 | 25.826 | 3.745 | Doral Heliport | Miami-Dade | FL | airport |
| 9 | 80.213 | 25.782 | 4.538 | Southeast Bank Operations Center Heliport | Miami-Dade | FL | airport |
| 10 | 80.212 | 25.792 | 4.651 | Jackson Memorial Hospital Heliport | Miami-Dade | FL | airport |
| 11 | 80.214 | 25.74 | 5.053 | Mercy Hospital Heliport | Miami-Dade | FL | airport |
| 12 | 80.154 | 25.85 | 5.543 | WFSVN Television Channel 7 Heliport | Miami-Dade | FL | airport |
| 13 | 80.162 | 25.884 | 7.882 | Biscayne Seaplane Base | Miami-Dade | FL | airport |
| 14 | 80.247 | 25.853 | 8.474 | Central District Police Station Heliport | Miami-Dade | FL | airport |
| 15 | 80.29 | 25.793 | 8.886 | Miami International Airport | Miami-Dade | FL | airport |
| 16 | 80.296 | 25.743 | 9.306 | Miami Childrens Hospital Heliport | Miami-Dade | FL | airport |
| 17 | 80.157 | 25.915 | 9.964 | Gold Coast Heliport | Miami-Dade | FL | airport |
| 18 | 80.15 | 25.917 | 10.051 | Intra Coastal Police Sub-Station Heliport | Miami-Dade | FL | airport |

Step-by-Step Go-To Place Tutorial or

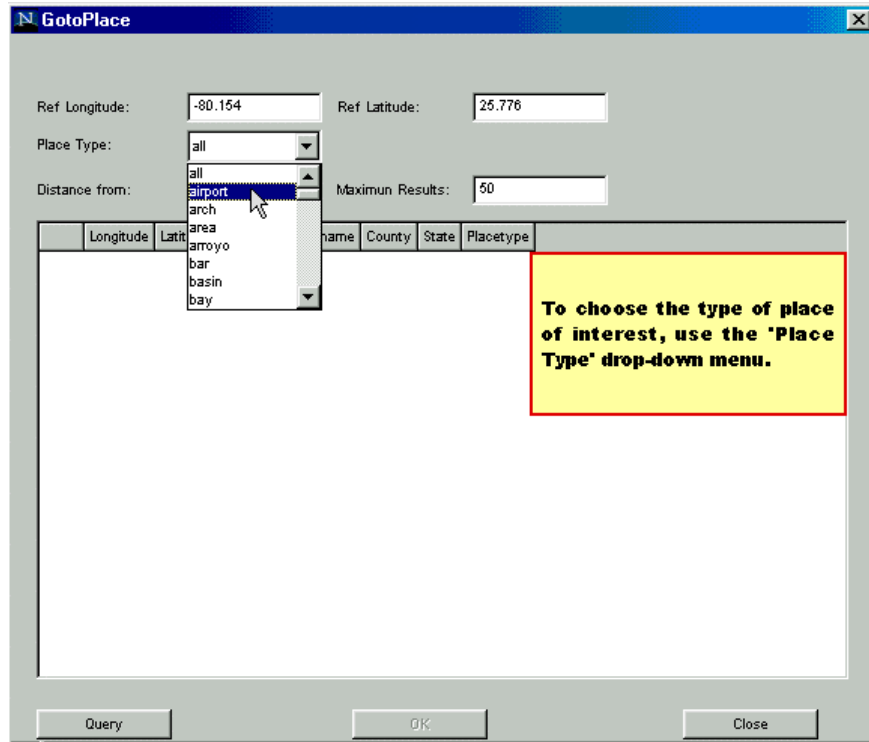
Step 1



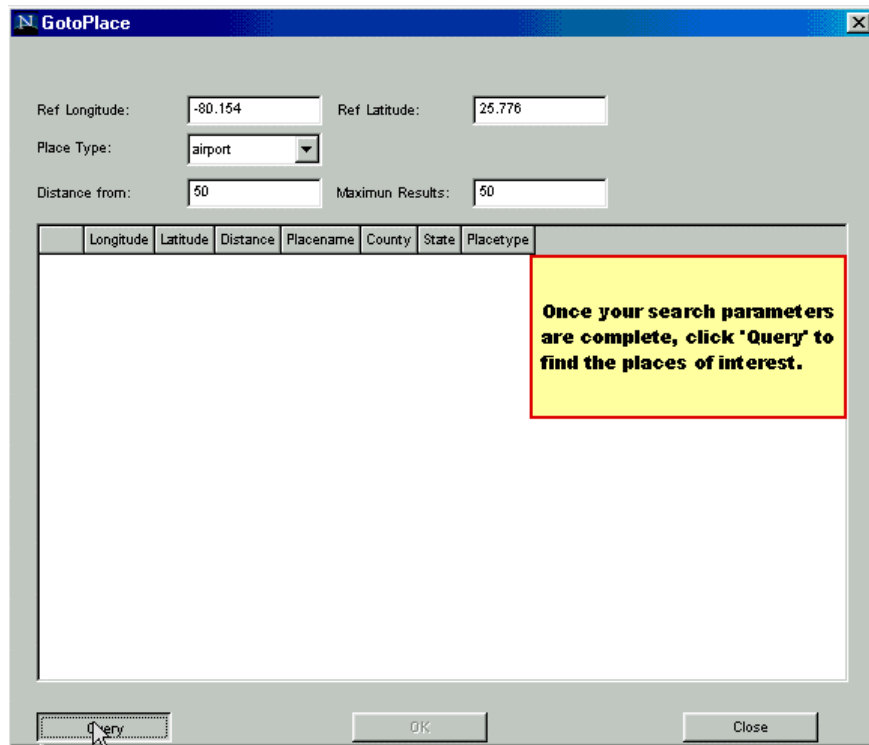
Step 2



Step 3



Step 4



Step 5

Ref Longitude: Ref Latitude:

Place Type:

Distance from: Maximum Results:

| | Longitude | Latitude | Distance | Placename | County | State | Placetype |
|----|-----------|----------|----------|---|------------|-------|-----------|
| 1 | 80.175 | 25.775 | 1.145 | Watson Island International Seaplane B | | | |
| 2 | 80.179 | 25.785 | 1.502 | Miami Heliport | | | |
| 3 | 80.139 | 25.756 | 1.631 | Fisher Island Heliport | | | |
| 4 | 80.185 | 25.788 | 1.917 | Miami Herald Heliport | | | |
| 5 | 80.192 | 25.772 | 2.096 | International Place Heliport | | | |
| 6 | 80.198 | 25.778 | 2.452 | Miami Police Heliport | | | |
| 7 | 80.141 | 25.816 | 2.817 | Emergency Heliport | | | |
| 8 | 80.213 | 25.782 | 3.284 | Southeast Bank Operations Center Heliport | Miami-Dade | FL | airport |
| 9 | 80.212 | 25.792 | 3.398 | Jackson Memorial Hospital Heliport | Miami-Dade | FL | airport |
| 10 | 80.121 | 25.826 | 3.872 | Doral Ocean Beach Resort Heliport | Miami-Dade | FL | airport |
| 11 | 80.214 | 25.74 | 4.148 | Mercy Hospital Heliport | Miami-Dade | FL | airport |
| 12 | 80.154 | 25.85 | 5.126 | WWSVN Television Channel 7 Heliport | Miami-Dade | FL | airport |
| 13 | 80.247 | 25.853 | 7.39 | Central District Police Station Heliport | Miami-Dade | FL | airport |
| 14 | 80.162 | 25.884 | 7.44 | Biscayne Seaplane Base | Miami-Dade | FL | airport |
| 15 | 80.29 | 25.793 | 7.616 | Miami International Airport | Miami-Dade | FL | airport |
| 16 | 80.296 | 25.743 | 8.169 | Miami Childrens Hospital Heliport | Miami-Dade | FL | airport |
| 17 | 80.157 | 25.915 | 9.593 | Gold Coast Heliport | Miami-Dade | FL | airport |
| 18 | 80.15 | 25.917 | 9.728 | Intra Coastal Police Sub-Station Heliport | Miami-Dade | FL | airport |

The query results are displayed in the white results area of the window. Results are ordered by distance to the reference coordinates.

Query OK Close

Step 6

Ref Longitude: Ref Latitude:

Place Type:

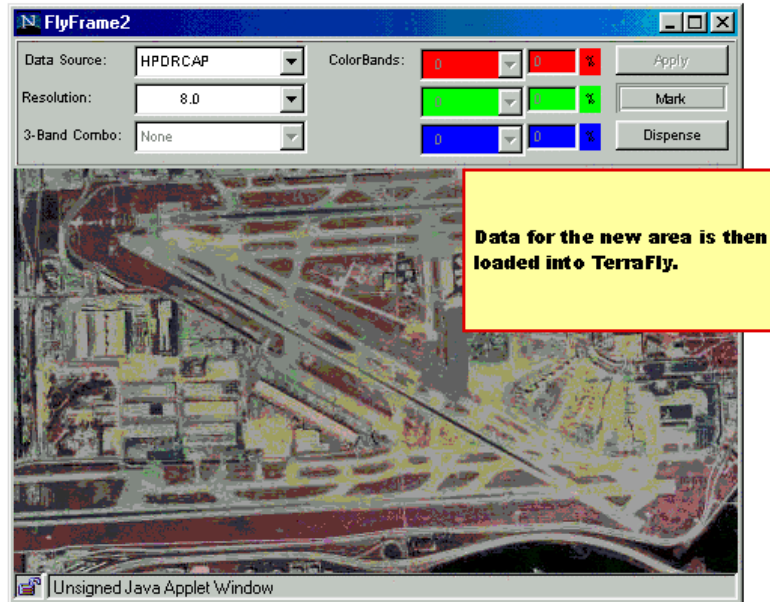
Distance from: Maximum Results:

| | Longitude | Latitude | Distance | Placename | County | State | Placetype |
|----|-----------|----------|----------|---|------------|-------|-----------|
| 1 | 80.175 | 25.775 | 1.145 | Watson Island International Seaplane B | | | |
| 2 | 80.179 | 25.785 | 1.502 | Miami Heliport | | | |
| 3 | 80.139 | 25.756 | 1.631 | Fisher Island Heliport | | | |
| 4 | 80.185 | 25.788 | 1.917 | Miami Herald Heliport | | | |
| 5 | 80.192 | 25.772 | 2.096 | International Place Heliport | | | |
| 6 | 80.198 | 25.778 | 2.452 | Miami Police Heliport | | | |
| 7 | 80.141 | 25.816 | 2.817 | Emergency Heliport | | | |
| 8 | 80.213 | 25.782 | 3.284 | Southeast Bank Operations Center Heliport | Miami-Dade | FL | airport |
| 9 | 80.212 | 25.792 | 3.398 | Jackson Memorial Hospital Heliport | Miami-Dade | FL | airport |
| 10 | 80.121 | 25.826 | 3.872 | Doral Ocean Beach Resort Heliport | Miami-Dade | FL | airport |
| 11 | 80.214 | 25.74 | 4.148 | Mercy Hospital Heliport | Miami-Dade | FL | airport |
| 12 | 80.154 | 25.85 | 5.126 | WWSVN Television Channel 7 Heliport | Miami-Dade | FL | airport |
| 13 | 80.247 | 25.853 | 7.39 | Central District Police Station Heliport | Miami-Dade | FL | airport |
| 14 | 80.162 | 25.884 | 7.44 | Biscayne Seaplane Base | Miami-Dade | FL | airport |
| 15 | 80.29 | 25.793 | 7.616 | Miami International Airport | Miami-Dade | FL | airport |
| 16 | 80.296 | 25.743 | 8.169 | Miami Childrens Hospital Heliport | Miami-Dade | FL | airport |
| 17 | 80.157 | 25.915 | 9.593 | Gold Coast Heliport | Miami-Dade | FL | airport |
| 18 | 80.15 | 25.917 | 9.728 | Intra Coastal Police Sub-Station Heliport | Miami-Dade | FL | airport |

To choose a particular place of interest, click on the row. To go to a place, click on "OK".

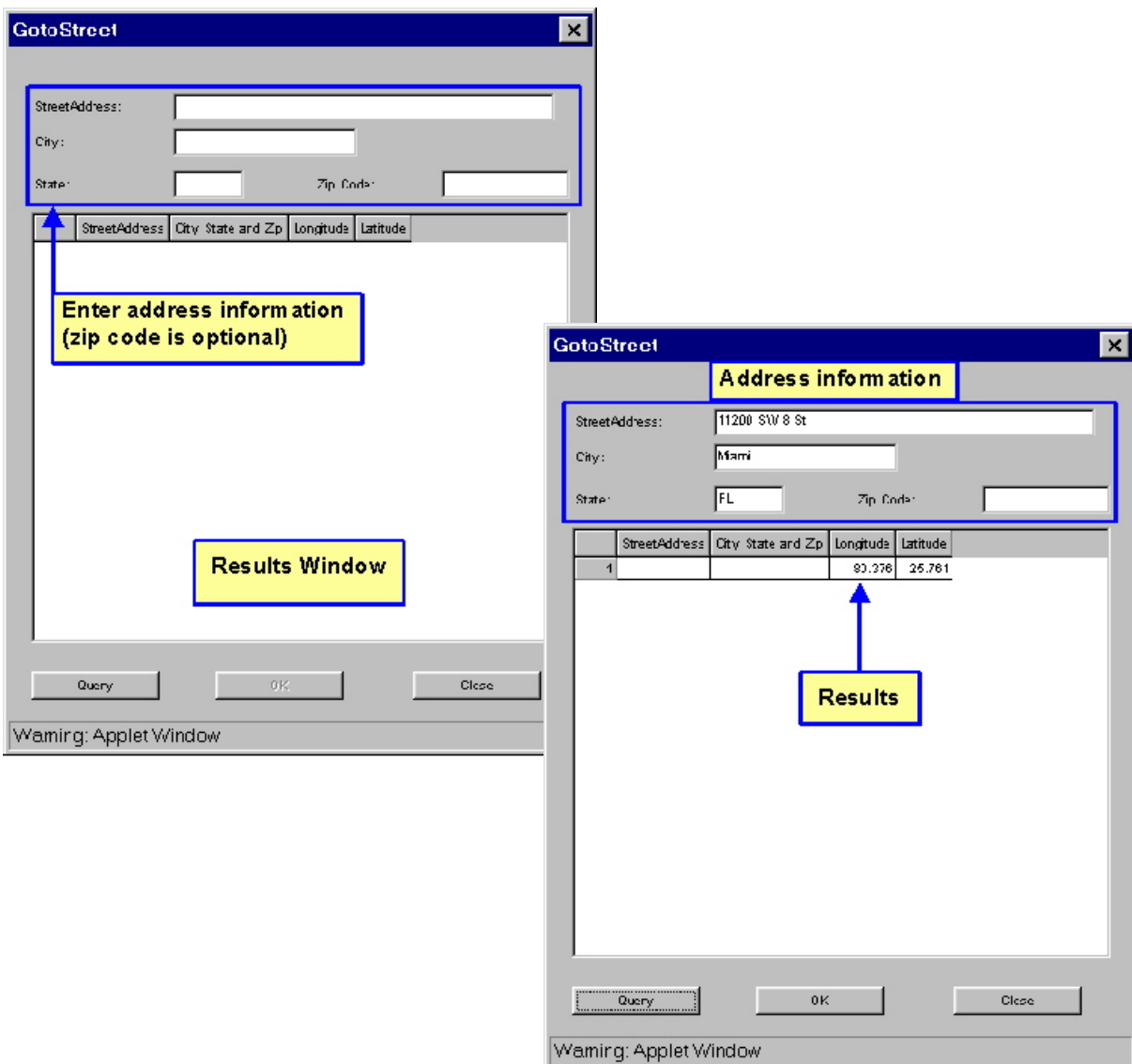
Query OK Close

Step 7



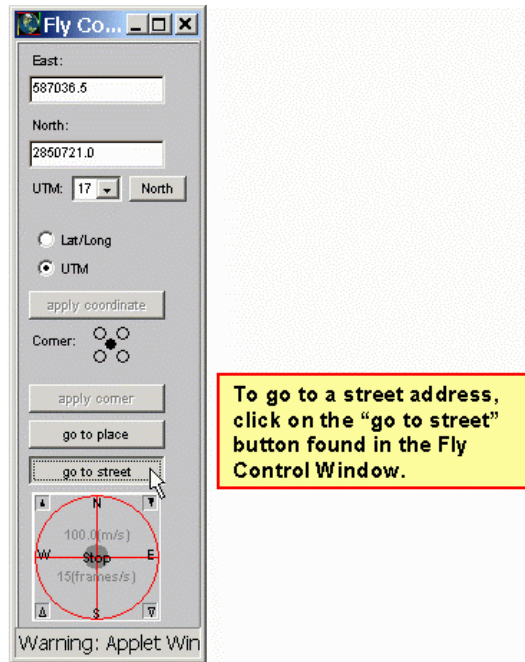
Go-To Street

To use the Go-To Street Address function, click on the "Go-To Street" button. This will open up another window which contains the Go-To Street Query form. By entering a street address, city, state and, optionally, zip code into the respective textboxes, you can query for the coordinates of a specific address. After all of the information is entered, clicking the "Query" button returns the street address query results. Click on the result and then click "Ok" to go to that address.

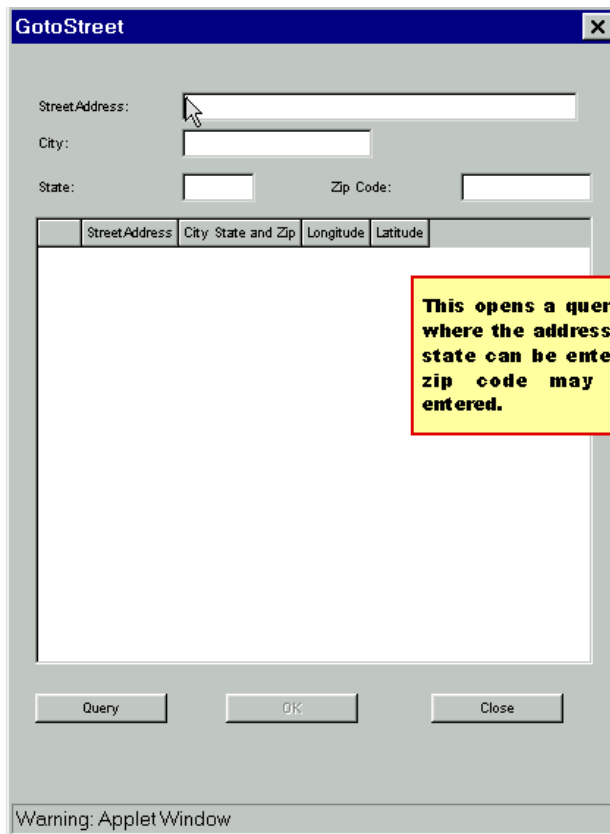


Step-by-Step Go-To Street Address Tutorial

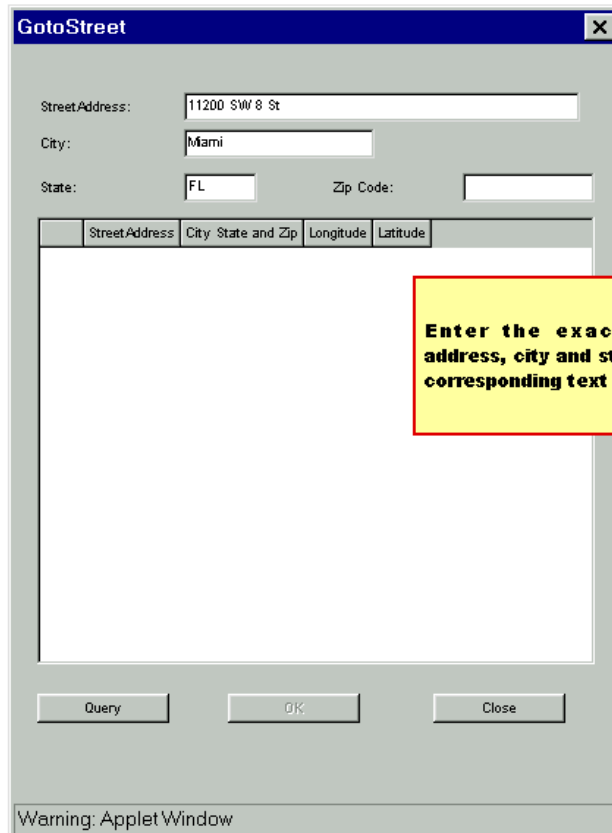
Step 1



Step 2



Step 3



GotoStreet

StreetAddress: 11200 SW 8 St

City: Miami

State: FL Zip Code:

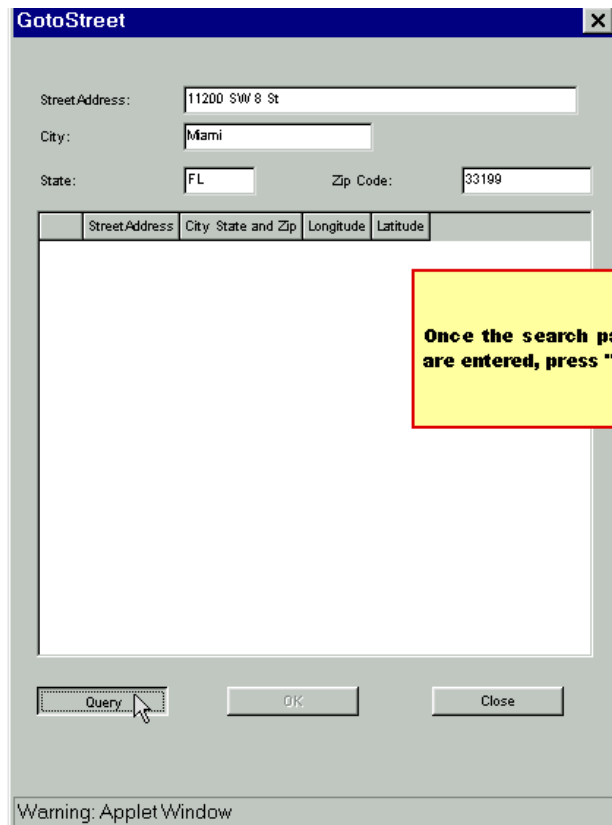
| StreetAddress | City | State and Zip | Longitude | Latitude |
|---------------|------|---------------|-----------|----------|
|---------------|------|---------------|-----------|----------|

Query OK Close

Warning: Applet Window

Enter the exact street address, city and state in the corresponding text boxes.

Step 4



GotoStreet

StreetAddress: 11200 SW 8 St

City: Miami

State: FL Zip Code: 33199

| StreetAddress | City | State and Zip | Longitude | Latitude |
|---------------|------|---------------|-----------|----------|
|---------------|------|---------------|-----------|----------|

Query OK Close

Warning: Applet Window

Once the search parameters are entered, press "Query".

Step 5

The screenshot shows the 'GotoStreet' applet window with the following fields filled: StreetAddress: 11200 SW 8 St, City: Miami, State: FL, Zip Code: 33199. A table below the fields contains the following data:

| | StreetAddress | City State and Zip | Longitude | Latitude |
|---|---------------|--------------------|-----------|----------|
| 1 | | | 80.376 | 25.761 |

A yellow callout box with a red border contains the text: **After a few moments, the latitude and longitude coordinates of the street address are displayed.**

At the bottom of the window, there are three buttons: 'Query', 'OK', and 'Close'. A mouse cursor is pointing at the 'Query' button.

Warning: Applet Window

Step 6

The screenshot shows the 'GotoStreet' applet window with the same data as in Step 5. The table data is the same:

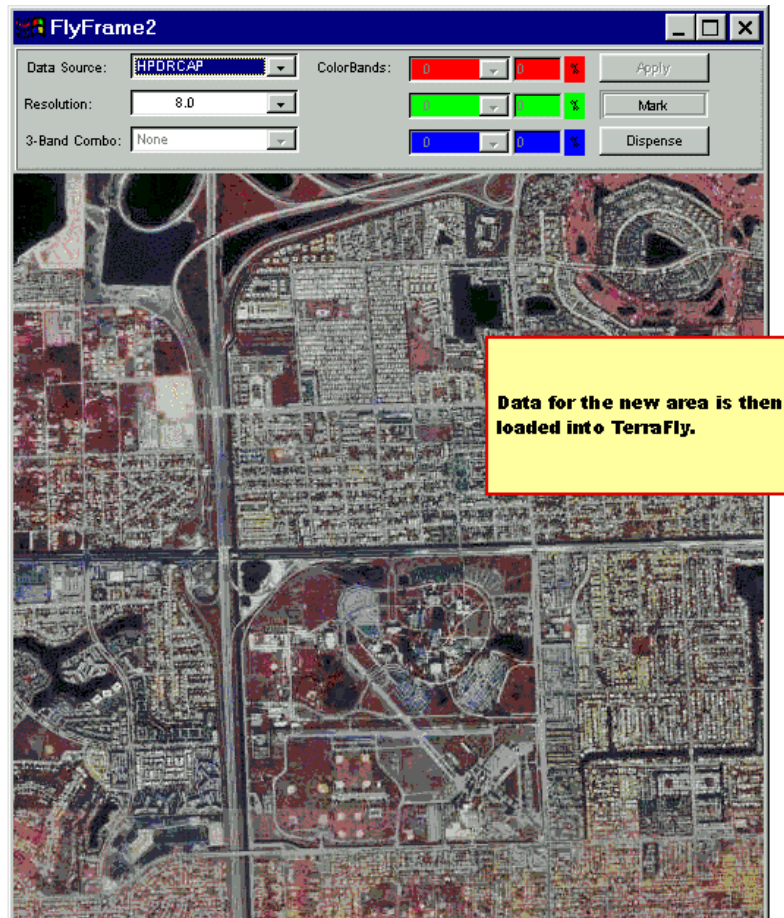
| | StreetAddress | City State and Zip | Longitude | Latitude |
|---|---------------|--------------------|-----------|----------|
| 1 | | | 80.376 | 25.761 |

A yellow callout box with a red border contains the text: **To go to the address, click on the coordinates and then click "OK".**

At the bottom of the window, there are three buttons: 'Query', 'OK', and 'Close'. A mouse cursor is pointing at the 'OK' button.

Warning: Applet Window

Step 7



Other features

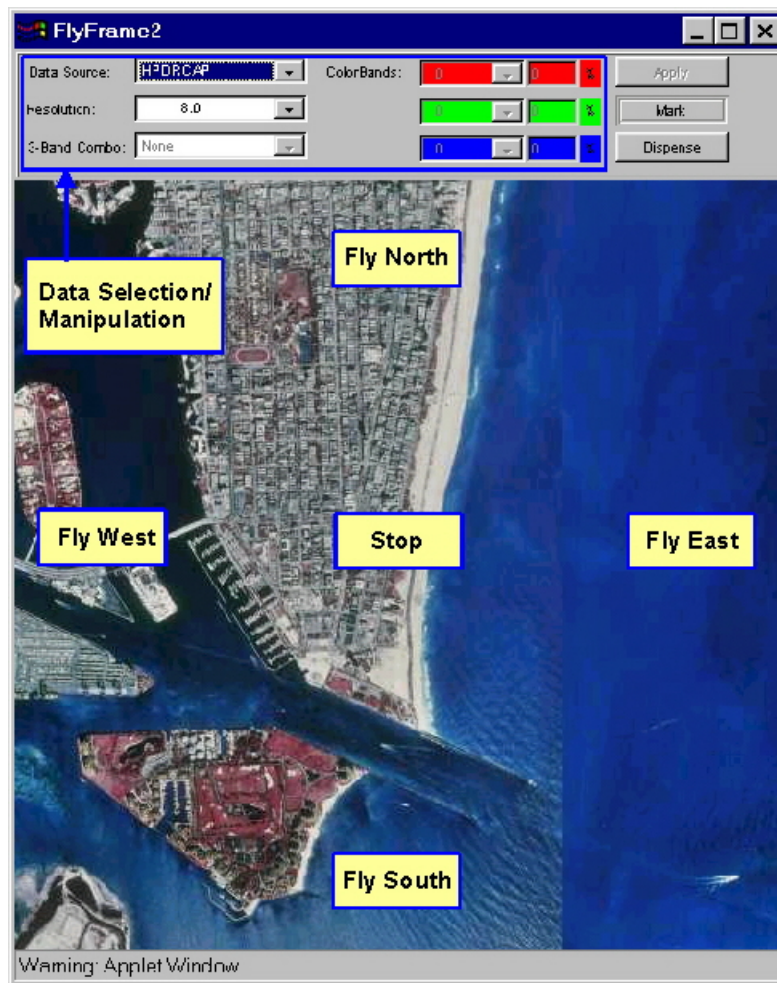
The other features available in the Flight Control window are the "help" button, "new fly frame" button, frame list, "new view frame" button, and "lookup config" button.

The "help" button launches another window containing the current document. The "new fly frame" button launches a new frame containing default data (which can, of course, be changed). The frame list displays list of the frames currently open. By clicking on a frame's name (e.g., FlyFrame1) in the list, that frame is brought to the forefront. The "new view frame" button launches a new window where the user can view data to which addition information and data manipulation capabilities can be added (see Data

Overlay and Filters below). The "lookup config" button launches a new window where the user may select the type of places to be displayed when using the Look Up feature (see Look Up Features below).

The FlyFrame Windows

Navigation can also be accomplished in the FlyFrame Windows. You can smoothly 'fly' over the data or through different types and resolutions of data. When multiple FlyFrames are open, smooth flight is synchronized between the open FlyFrames. Changes in data type, resolution or data manipulation are independent for each FlyFrame.

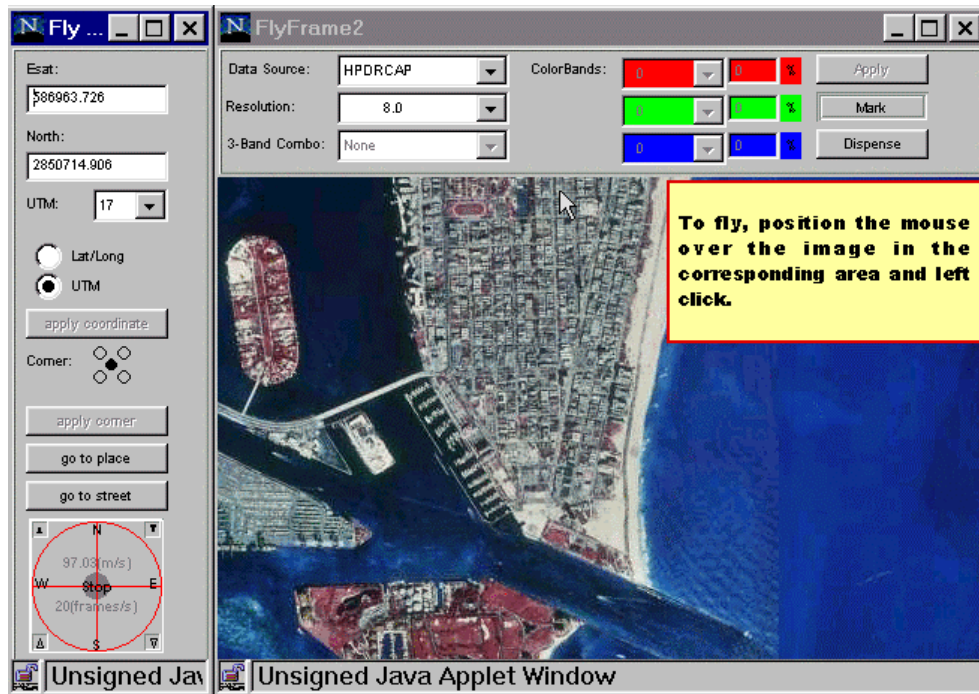


Smooth Flight

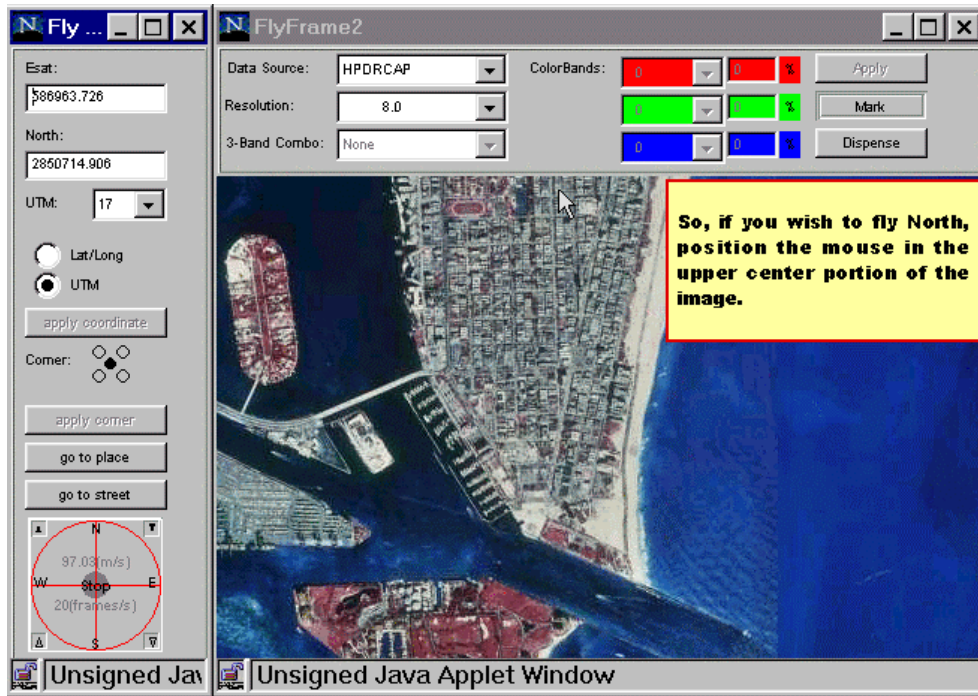
To 'Fly' smoothly, click on the associated desired flight direction on the image. So, if you want to fly North, click on upper center portion of the screen. To stop, click in the center. Speed can also be adjusted by clicking closer to the center of the image to fly slower or closer to the edge of the image to fly faster.

Step-by-Step Flying Tutorial

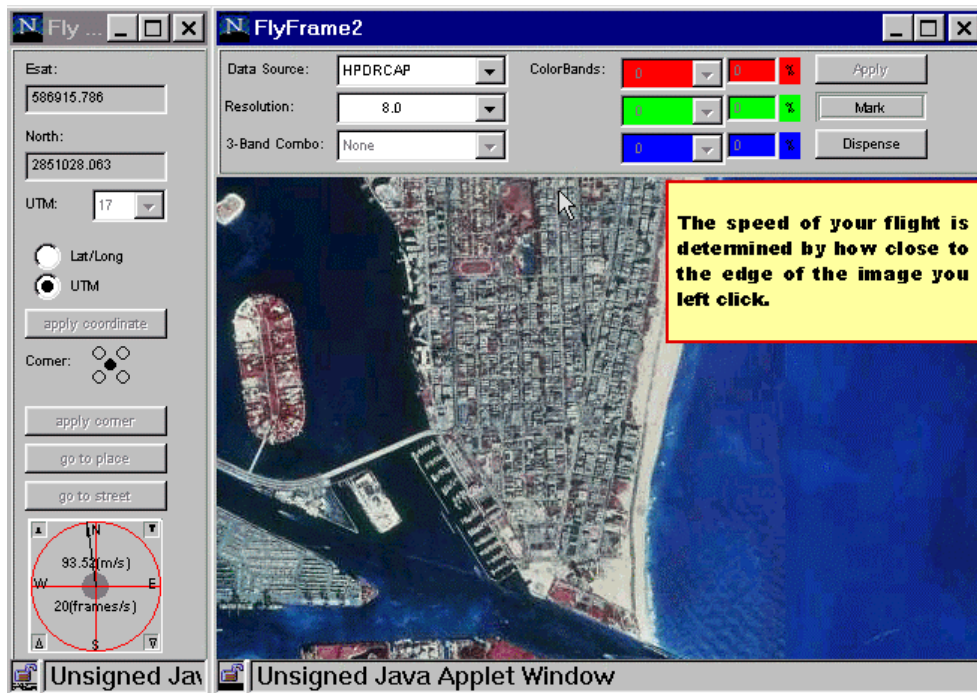
Step 1



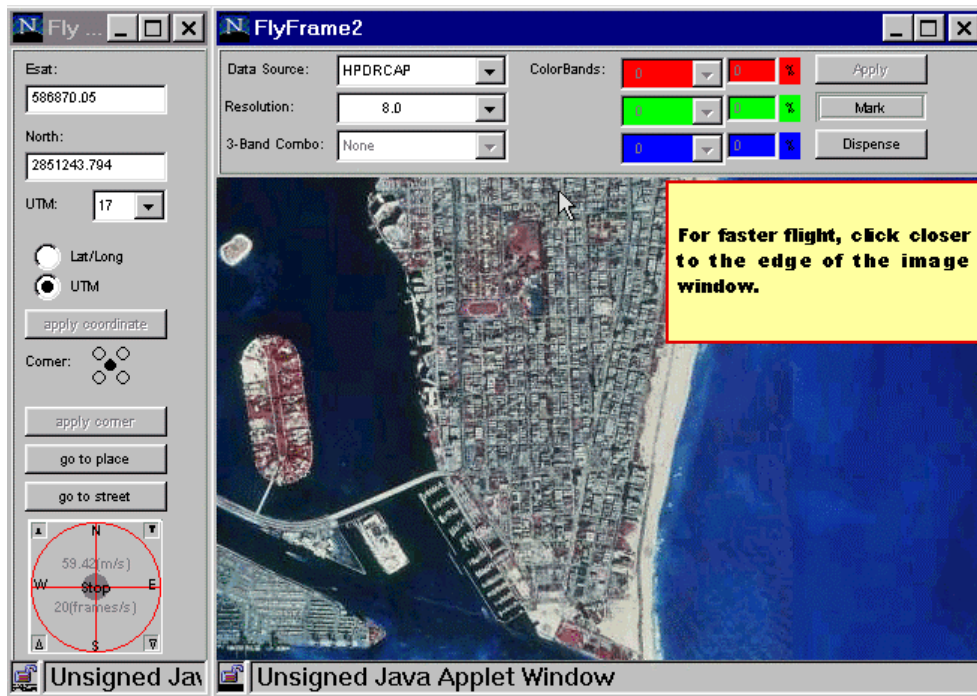
Step 2



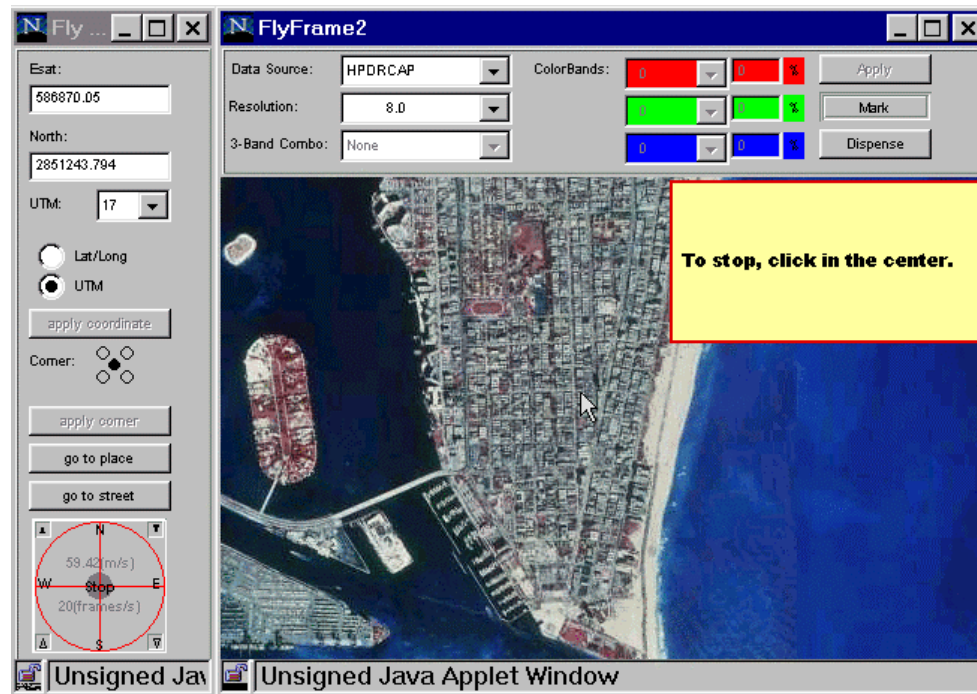
Step 3



Step 4

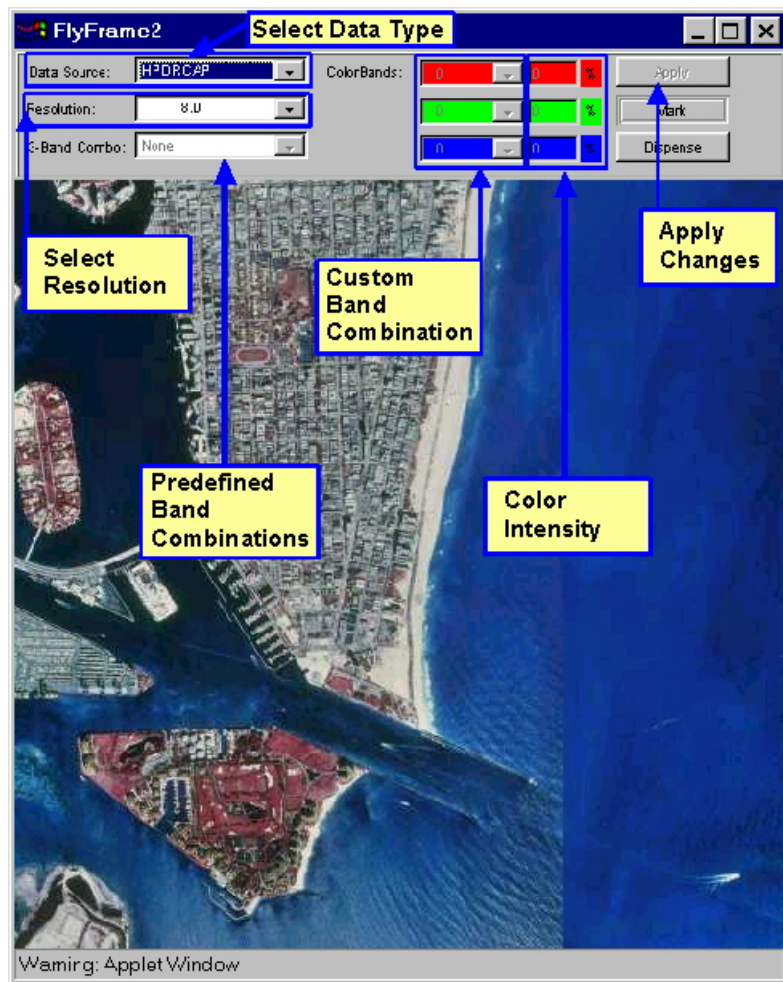


Step 5



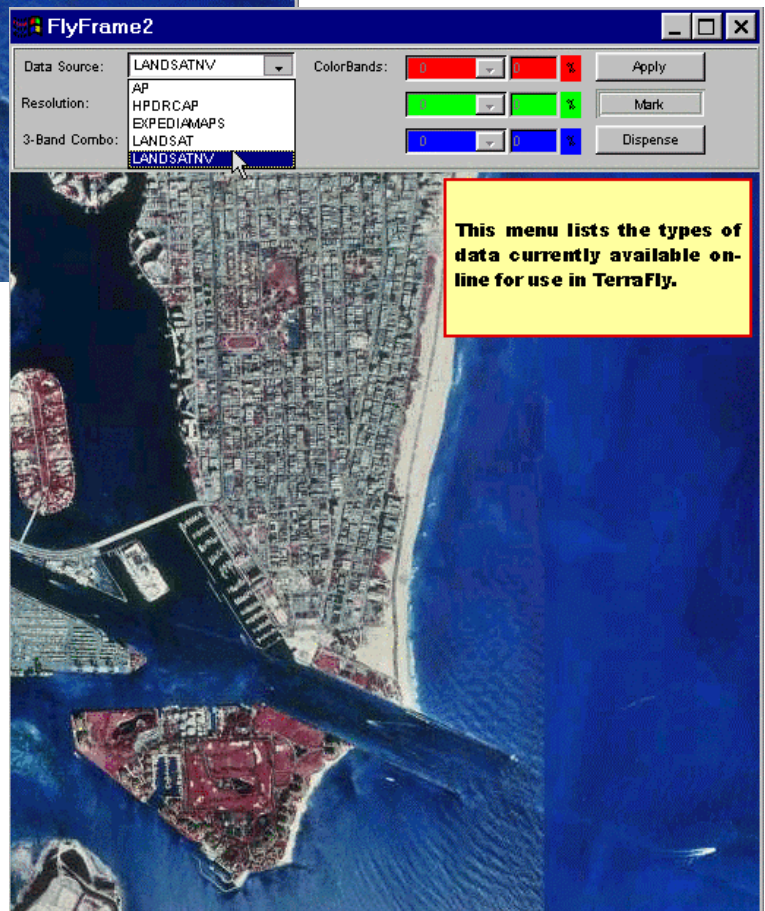
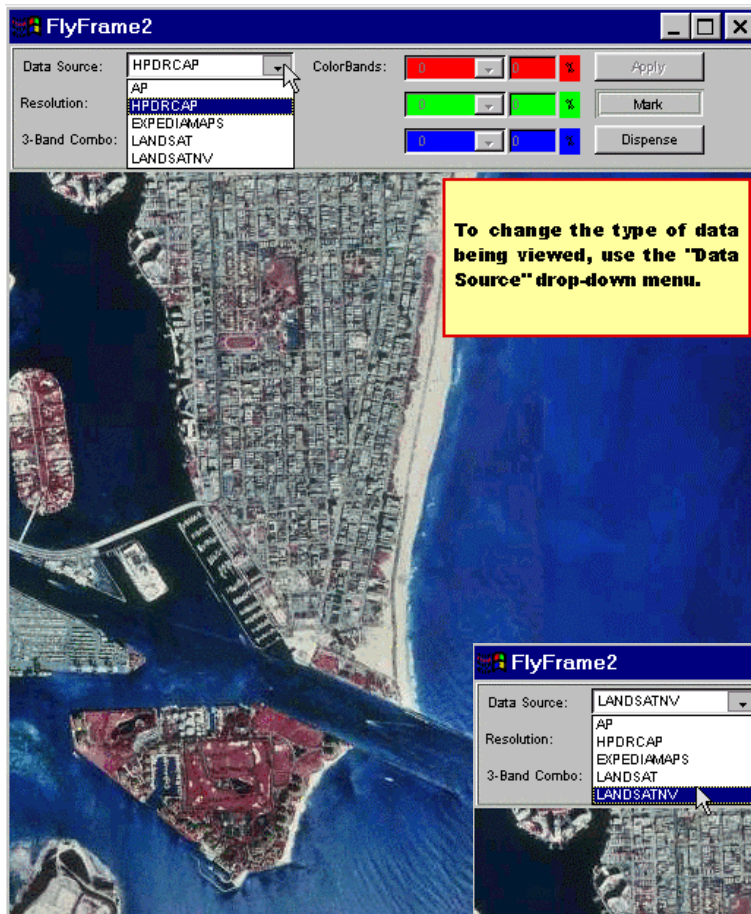
Changing Data Types and Resolution

TerraFly is designed to navigate and manipulate virtually any type of remotely sensed data. The types and amount of data available is vast. There are multiple types and resolutions of data currently available for use in TerraFly. These can be chosen via our "Data Source" and "Resolution" drop-down menus. Simply click on the associated arrow, scroll down to select the data type or resolution of interest and then click the "Apply" button.

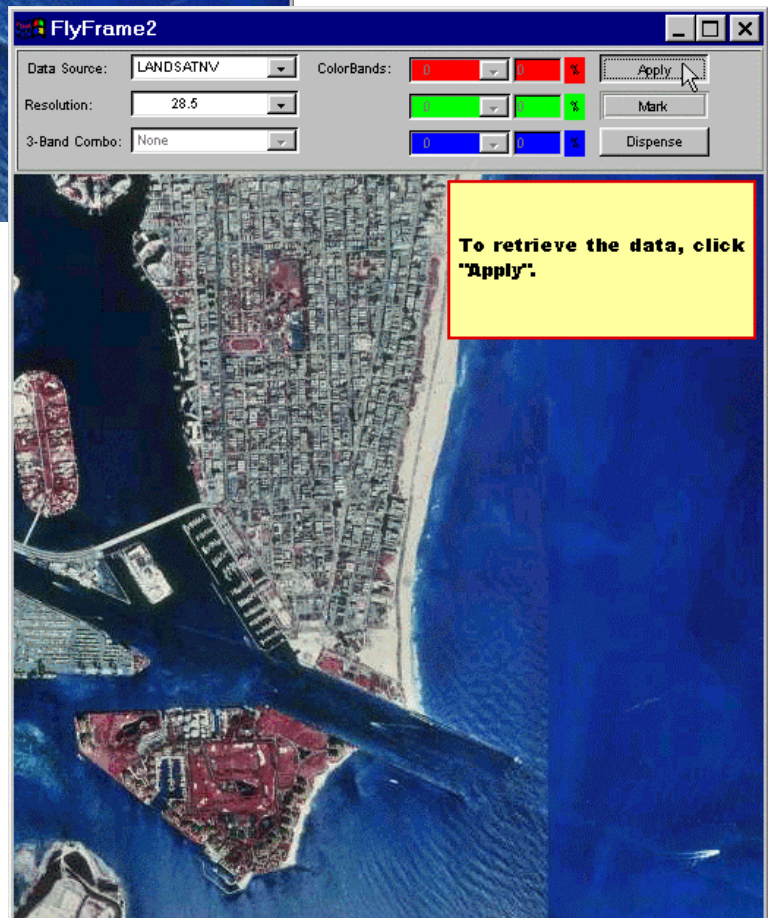


Step-by-Step Tutorial for Changing Data Type and Resolution or

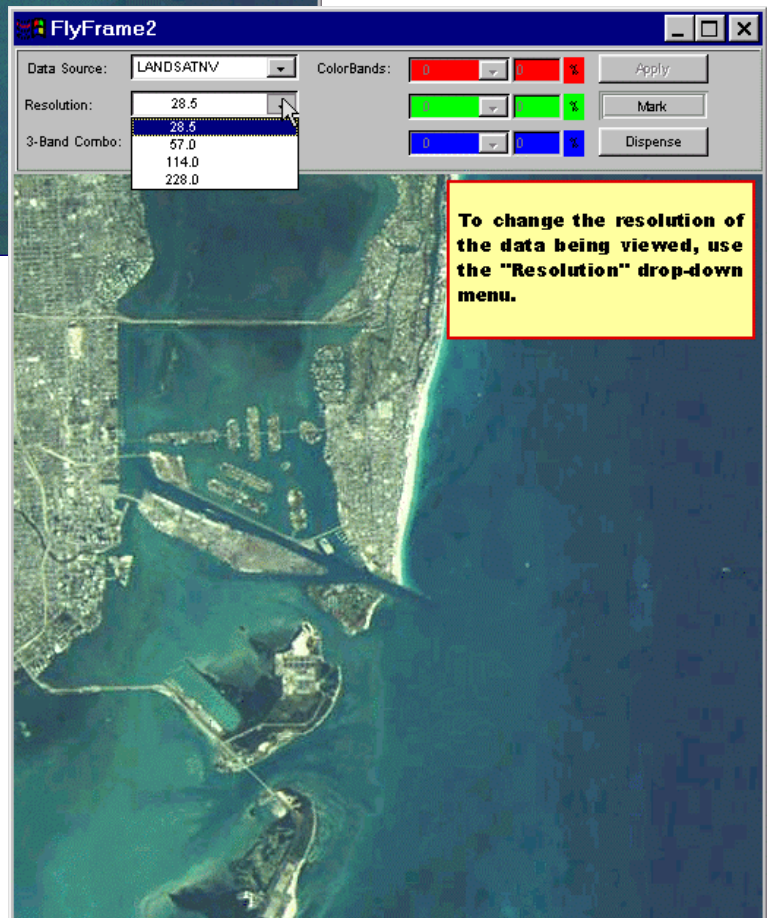
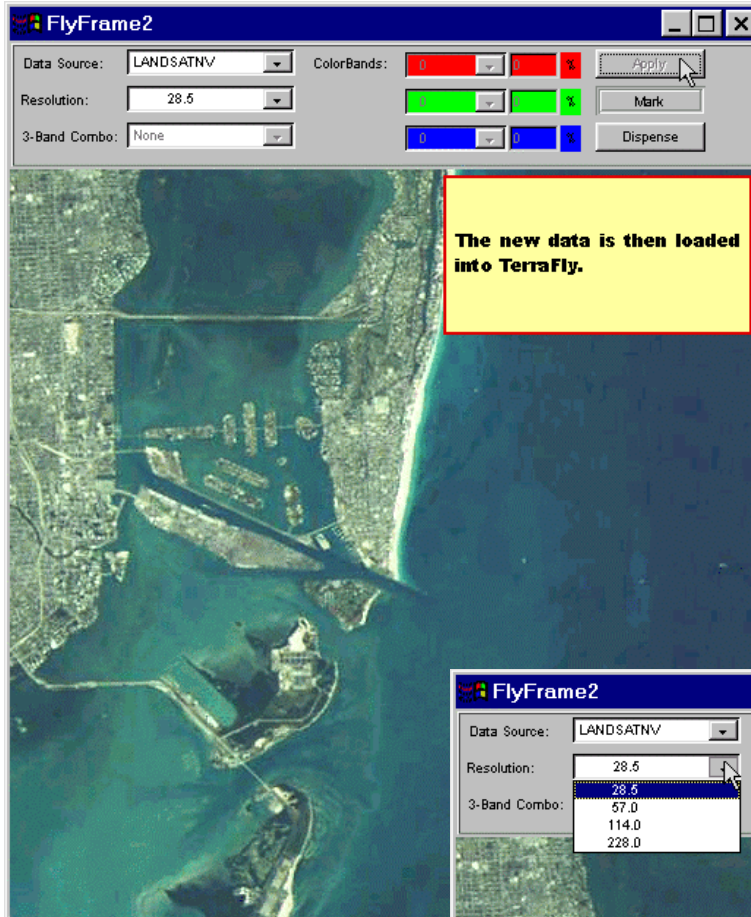
Steps 1 and 2



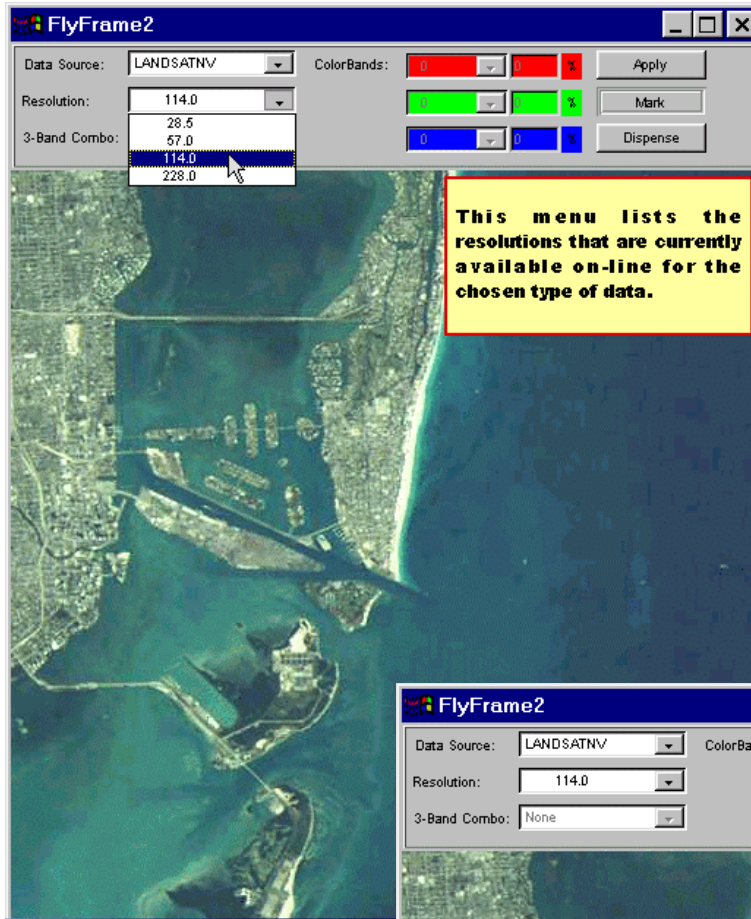
Step 3 and 4



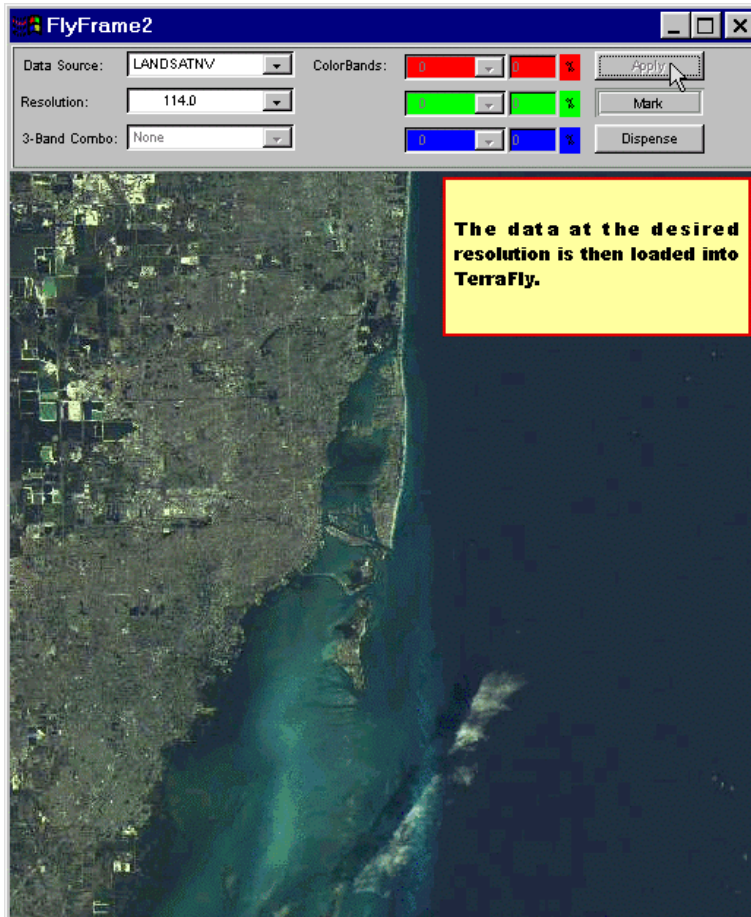
Steps 5 and 6



Steps 7 and 8



Step 9



Data Manipulation

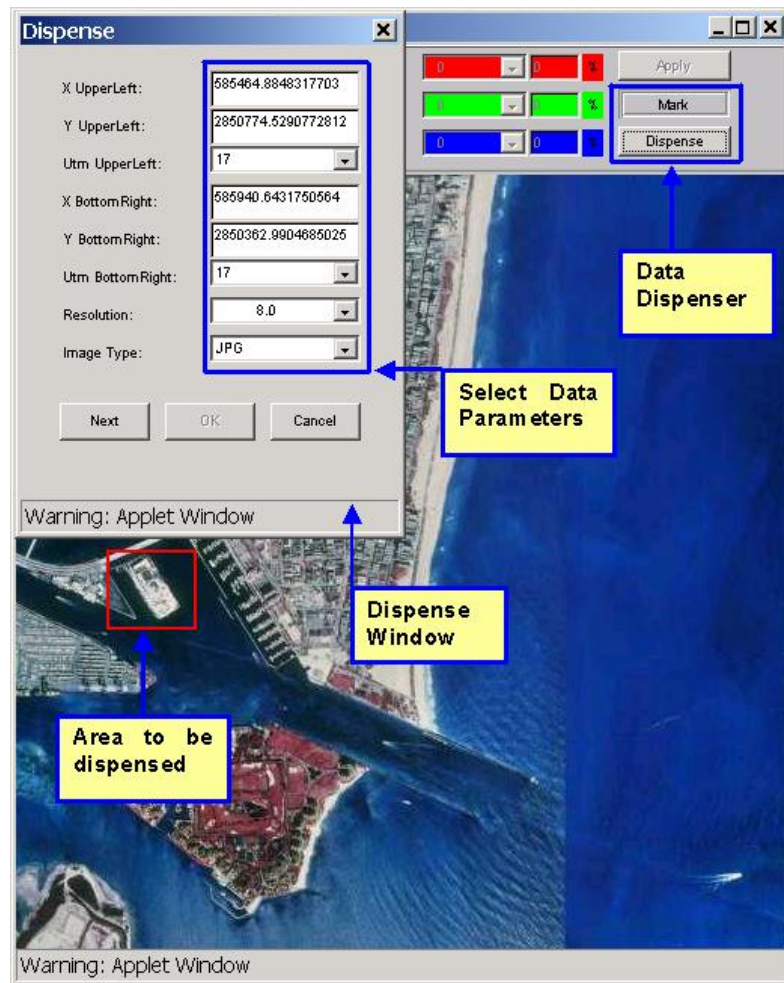
TerraFly also provides some basic data manipulation capabilities. When dealing with multi-spectral data such as Landsat TM, TerraFly provides the capability to combine the spectral bands on-the-fly using predefined, commonly used band combinations or by allowing users to custom choose the band combination of interest. This manipulation is done via "3-band combo" and "ColorBands" drop-down menus. Click on the associated arrows, scroll down to select the desired band combination and then click the "Apply" button. One thing to note when doing this type of manipulation is that because a large amount of data must be sent over the Internet when retrieving multiple bands, the delay in

receiving the new data is slightly greater than for non-spectral data such as Aerial Photography.

The RGB Color Intensity of the images can also be adjusted. To do so, select the associated intensity value, enter the new value and click "Apply".

Dispenser Features

TerraFly would not be complete without a way of acquiring the data being viewed. To do this, an easy-to-use, graphics-based Data Dispenser has been provided. To retrieve data from an area of interest:

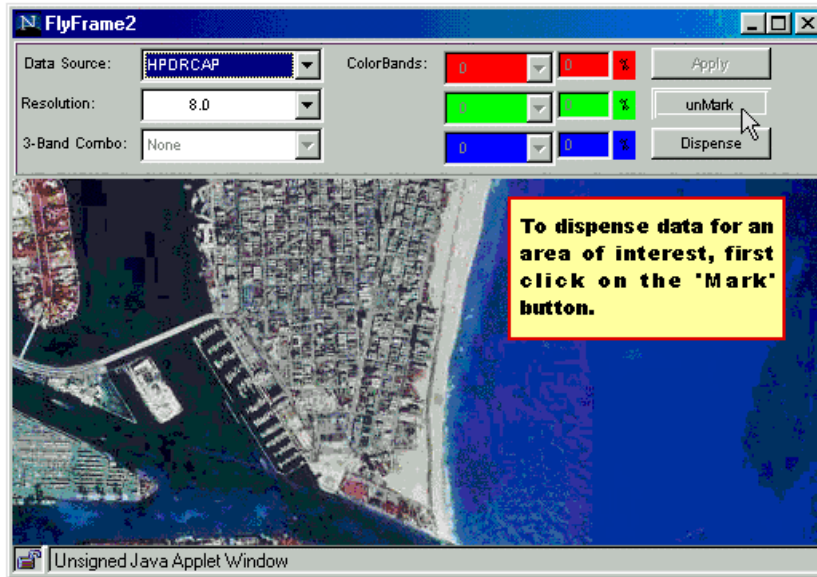


To retrieve the data of interest:

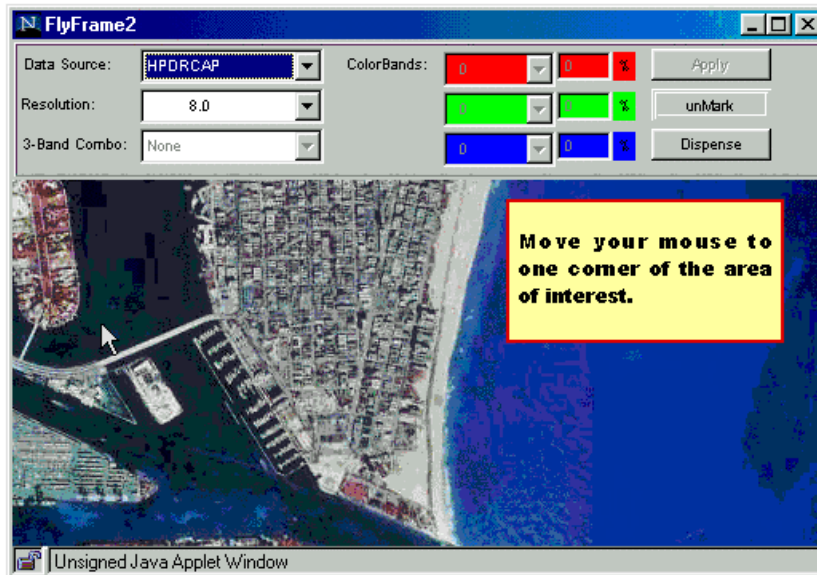
- 1) click on the "Mark" button,
- 2) move the cursor to one corner of the area to be dispensed,
- 3) hold down the left mouse button and drag the cursor until the area of interest is surrounded by the red box,
- 4) release the mouse button and click on the "Dispense" button,
- 5) the Dispense window will appear,
- 6) make any needed data parameter changes such as changing the desired resolution ,
- 7) click "Next",
- 8) file and image size information is displayed,
- 9) click "Ok" to request the data (or click back to change the request),
- 10) a new window is launched with information regarding the chosen area,
- 11) click on the link at the bottom of the page to view or retrieve that data.

Step-by-Step Tutorial for Dispensing Data or

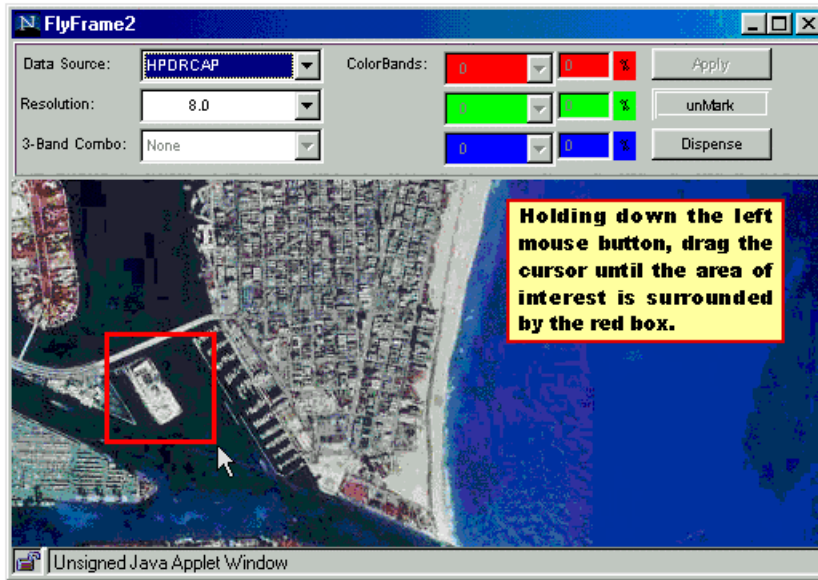
Step 1



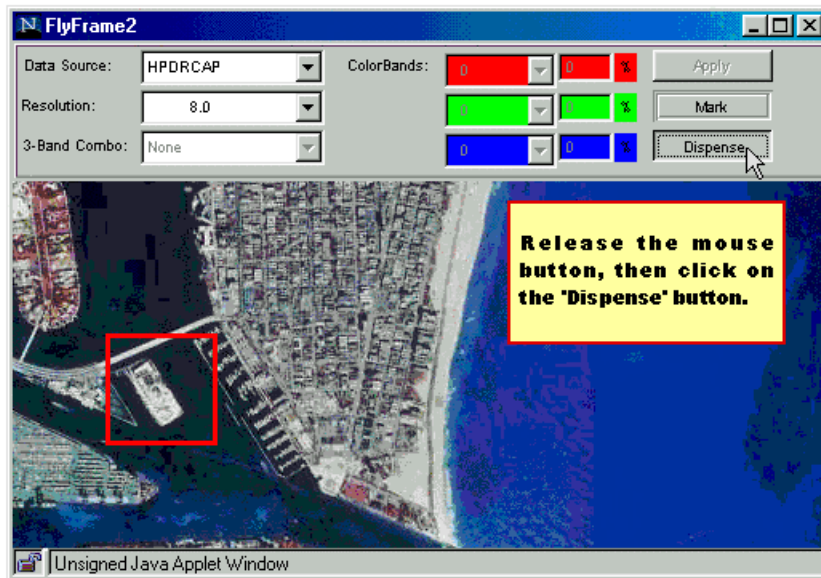
Step 2



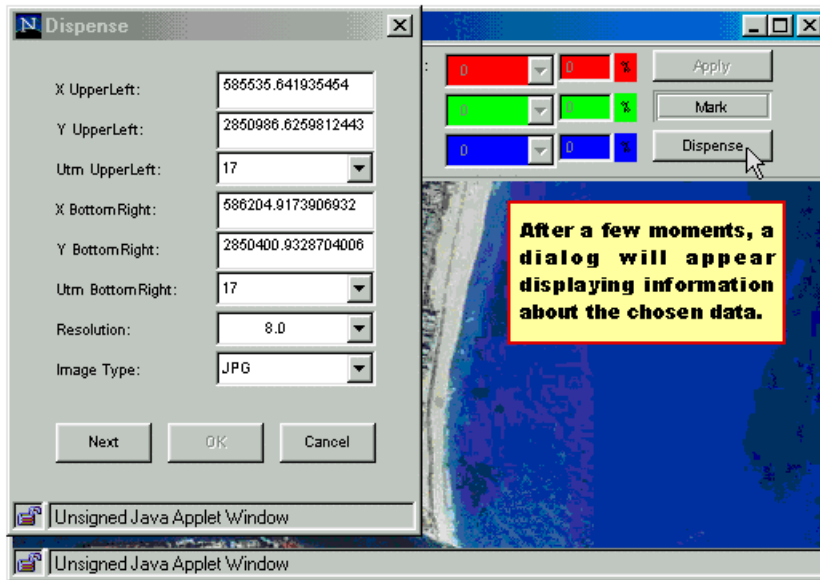
Step 3



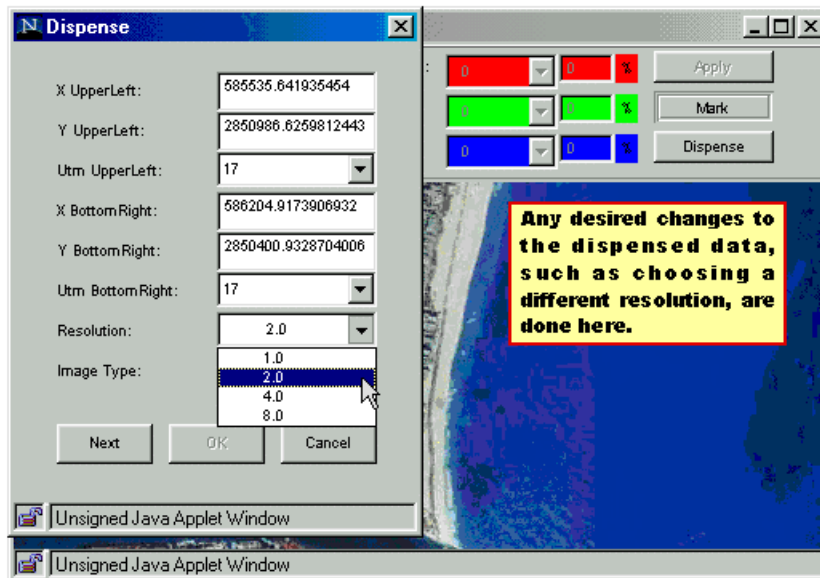
Step 4



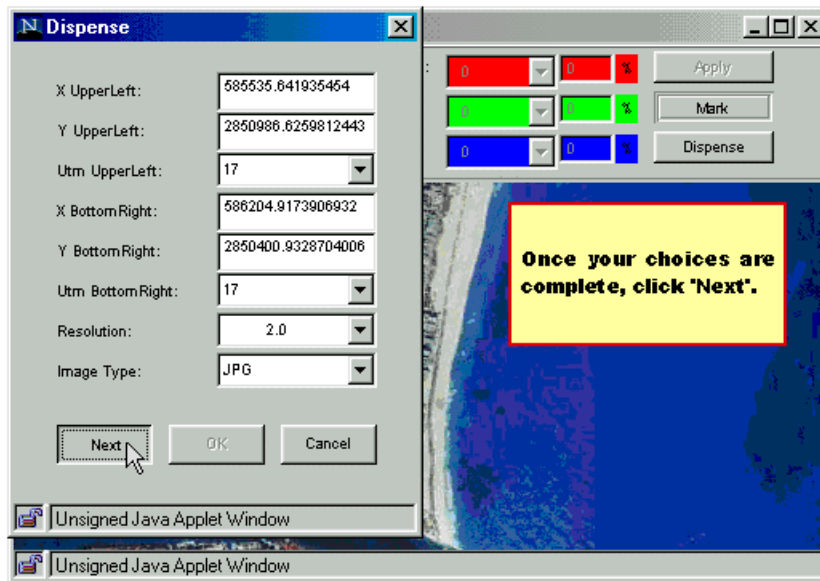
Step 5



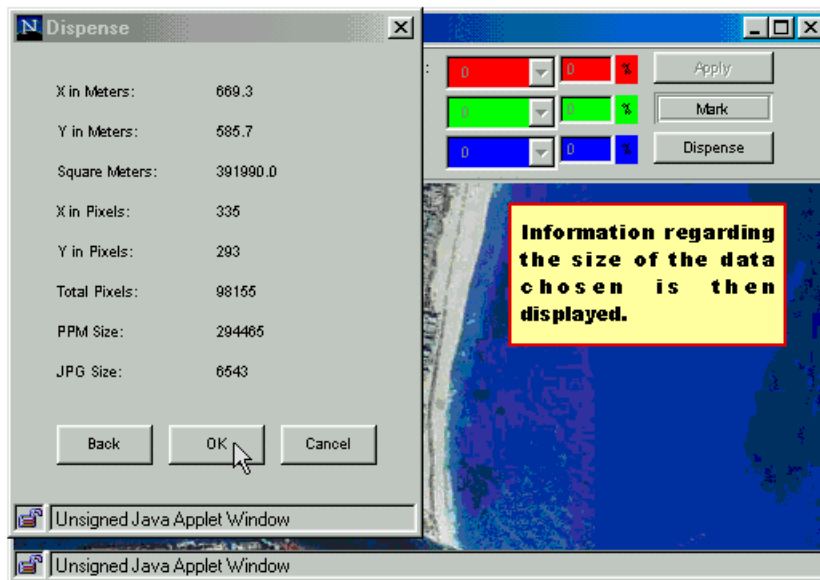
Step 6



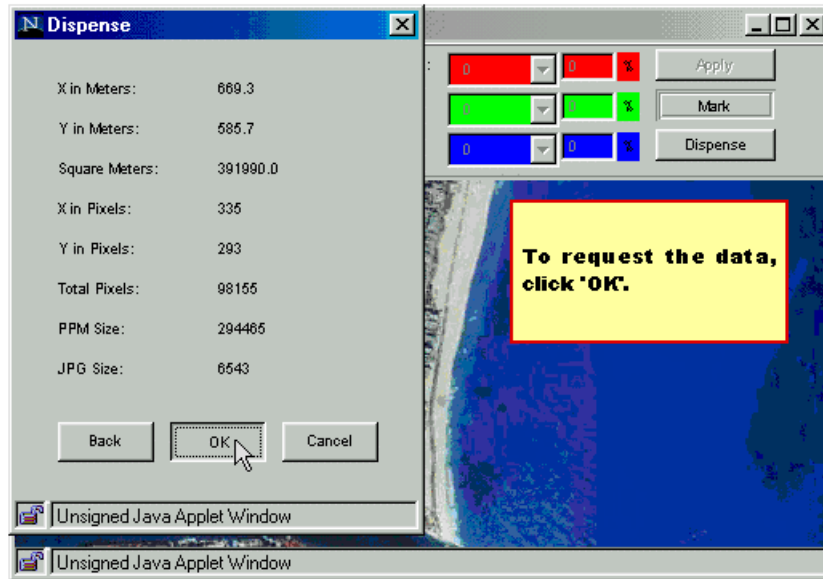
Step 7



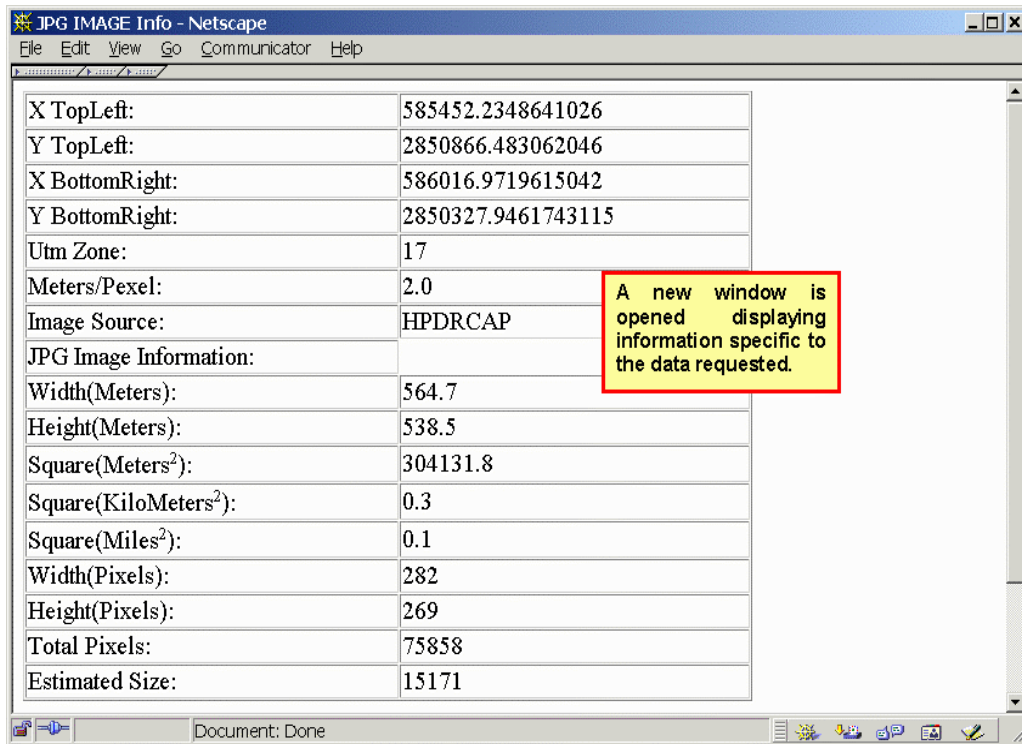
Step 8



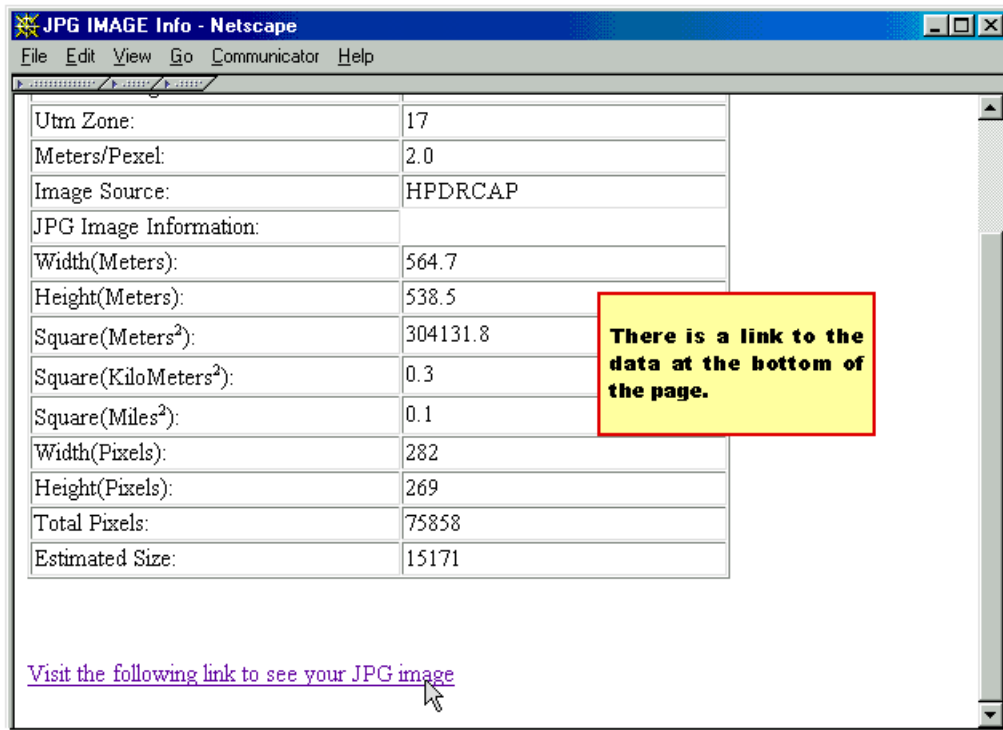
Step 9



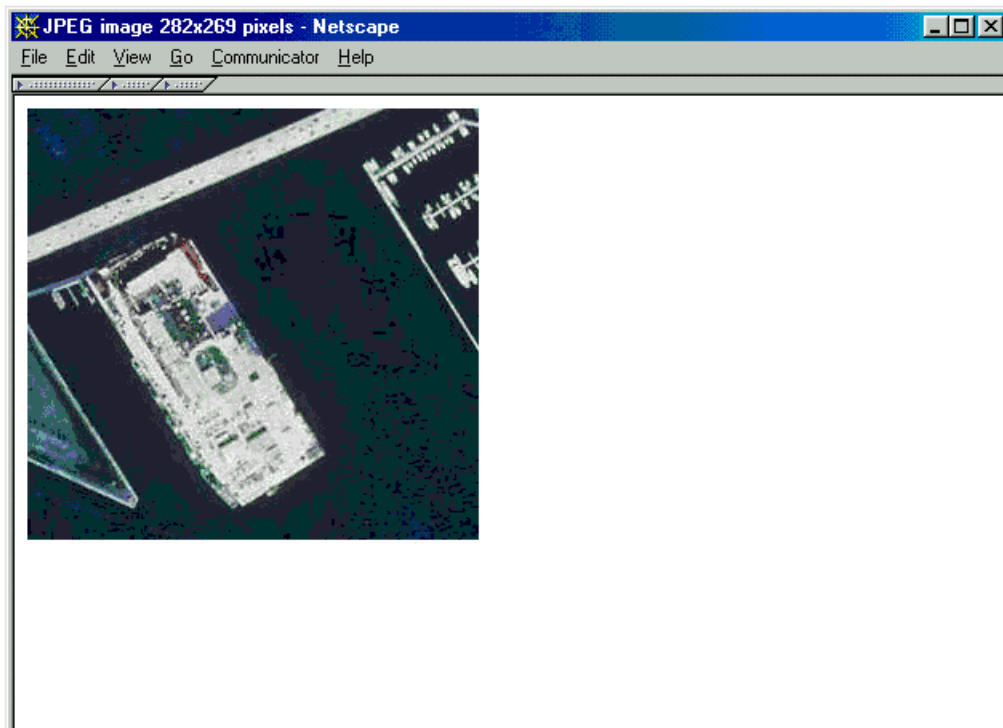
Step 10



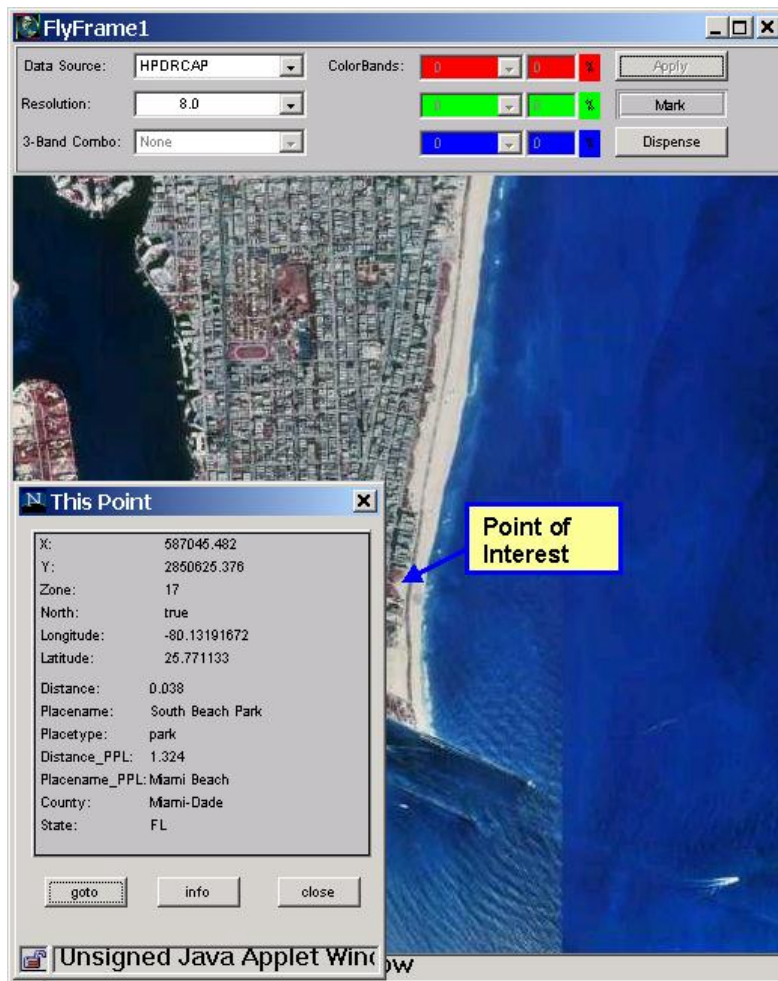
Step 11



Step 12



Look-up Features

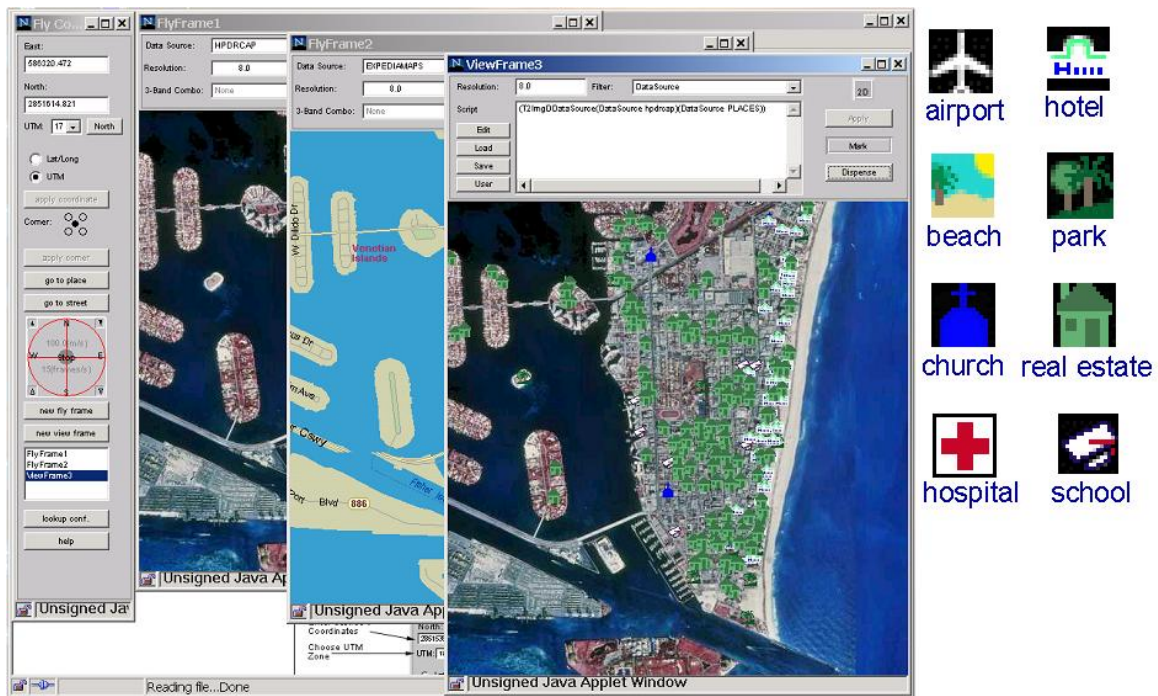


To further help gain information about a particular area being viewed, TerraFly has incorporated two information look-up features. The first Point of Interest window displays the latitude/longitude and UTM coordinates of the point, the nearest place, place type and distance (in miles) to the point, and the closest populated place (ppl), including the county and state, along with distance to the point. To get this information, stop flying, position the mouse over the point of interest and Ctrl-click on the point. Once viewing the point's information, the user may click on "bring to ref point" to center the image on the chosen point.

Information regarding a particular point's coordinates can also be displayed while flying by pressing Ctrl-click over a point. This will stop the flight and display the point's coordinates in a yellow window for as long as the mouse button is held down. Once released, the yellow window disappears and flight continues.

Data Overlay and Filters

TerraFly offers information overlay features and image processing filters that enable users to customize the display of data. Information overlay allows users to highlight specific features from the database and to overlay data with different sources. To overlay data, the user must open a new frame by clicking on the “new view frame”



button on the FlyControl window. A new ViewFrame is displayed. Data may be overlaid manually, by typing the script to be used on the textbox provided (if the syntax is known), or graphically, by using the TreeEditor.

Information overlay “bridges” two or more images into one final image. The TreeEditor represents the overlay function through a tree. A two-image overlay is graphically shown as a three-node binary tree where the top node represents the final image; two child nodes represent the two original images. To use the TreeEditor, the user must click “Edit” on the new ViewFrame. The “TreeEditor” window is displayed. On the TreeEditor window, “Add” and “Parameter” buttons are used to build the function tree from the top down. The “Add” button adds a node to the tree. When adding a node, the user must specify the type of operation to perform. There are three possible operation types: Tconnector (used for image overlay), filter and ImgSrc (used to represent the original image data). When overlaying two images the resulting image should be a Tconnector; the two child nodes are imageSources. The “Parameter” button specifies the data type being manipulated (IKONOSSharpen, Aerial Photography, etc). The “check” and “compile” buttons display error messages if the tree construction fails. If the compilation process is successful, the “GenScript” button creates the final function. Once the script is generated, the script appears on the ViewFrame textbox; the newly customized image will be displayed in ViewFrame3 by clicking on the “Apply” button.

Image Processing Filters enhance the appearance of images. To apply a filter, the user follows a process similar to that used for image overlays. However, filters are applied to a single image at a time. Therefore, if using the TreeEditor, the tree structure should resemble that of a unary tree with a parent node (resulting image) of type filter.

In contrast to information overlay, which “bridges” two or more images into one, image processing filters are implemented by passing a single image through a filter

function. Thus, when filtering data, the TreeEditor creates a unary tree structure to graphically represent the filter function.