

# TerraFly

via Internet2, AMPATH,  
and the NAP of the Americas

High Performance Database Research Center  
and NASA Regional Applications Center  
at Florida International University

Naphtali Rishe, Director



## who are we?

- High Performance Database Research Center / NASA Regional Applications Center in the School of Computer Science
- Located at Florida International University in Miami, Florida
- Under direction of Dr. Naphtali Rische
- 100 researchers and staff

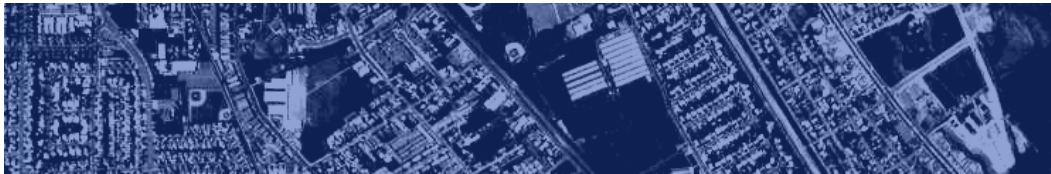




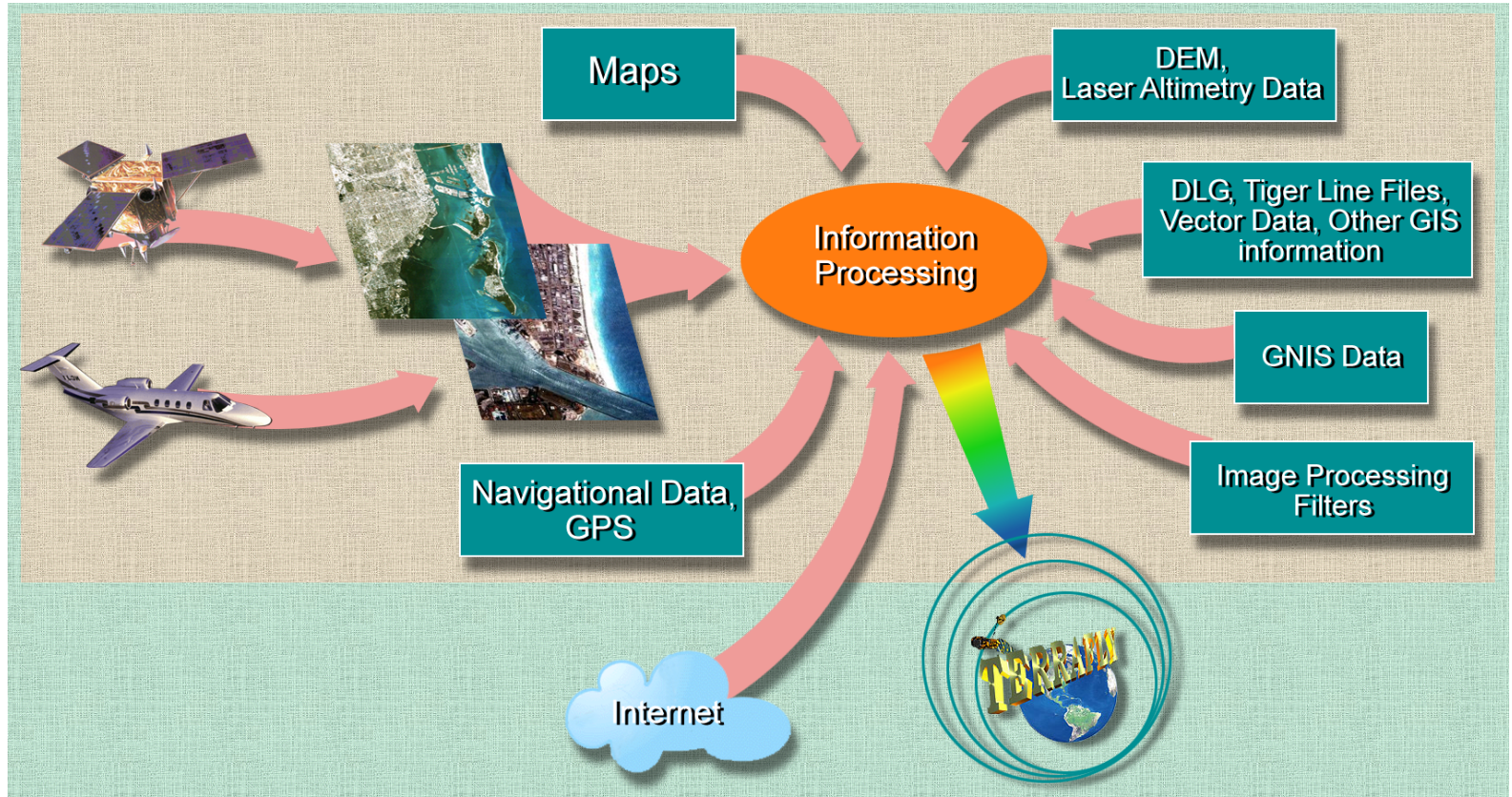
## our collaborators

- \$27 million in research support from our primary collaborators:
  - National Aeronautics and Space Administration (NASA)
  - National Science Foundation (NSF)
  - United States Geological Survey (USGS)
  - International Business Machines (IBM)





# what's in TerraFly?





web-based



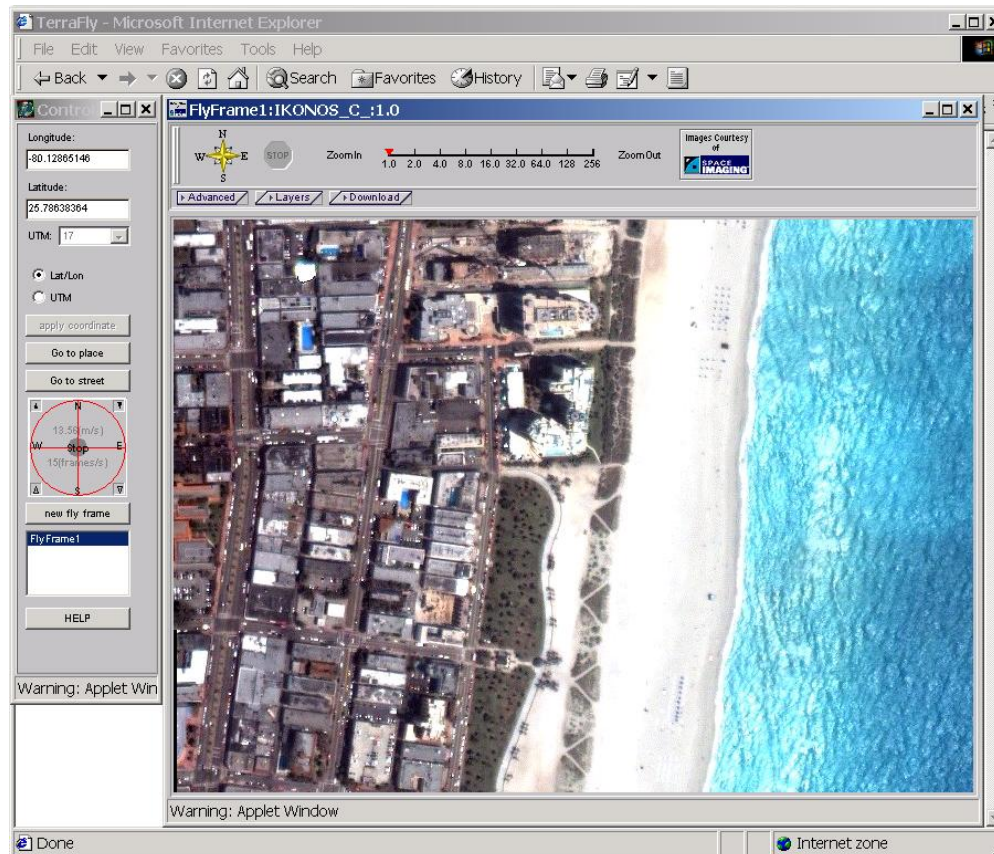
Infrared image over North-East Rondonia, Brazil





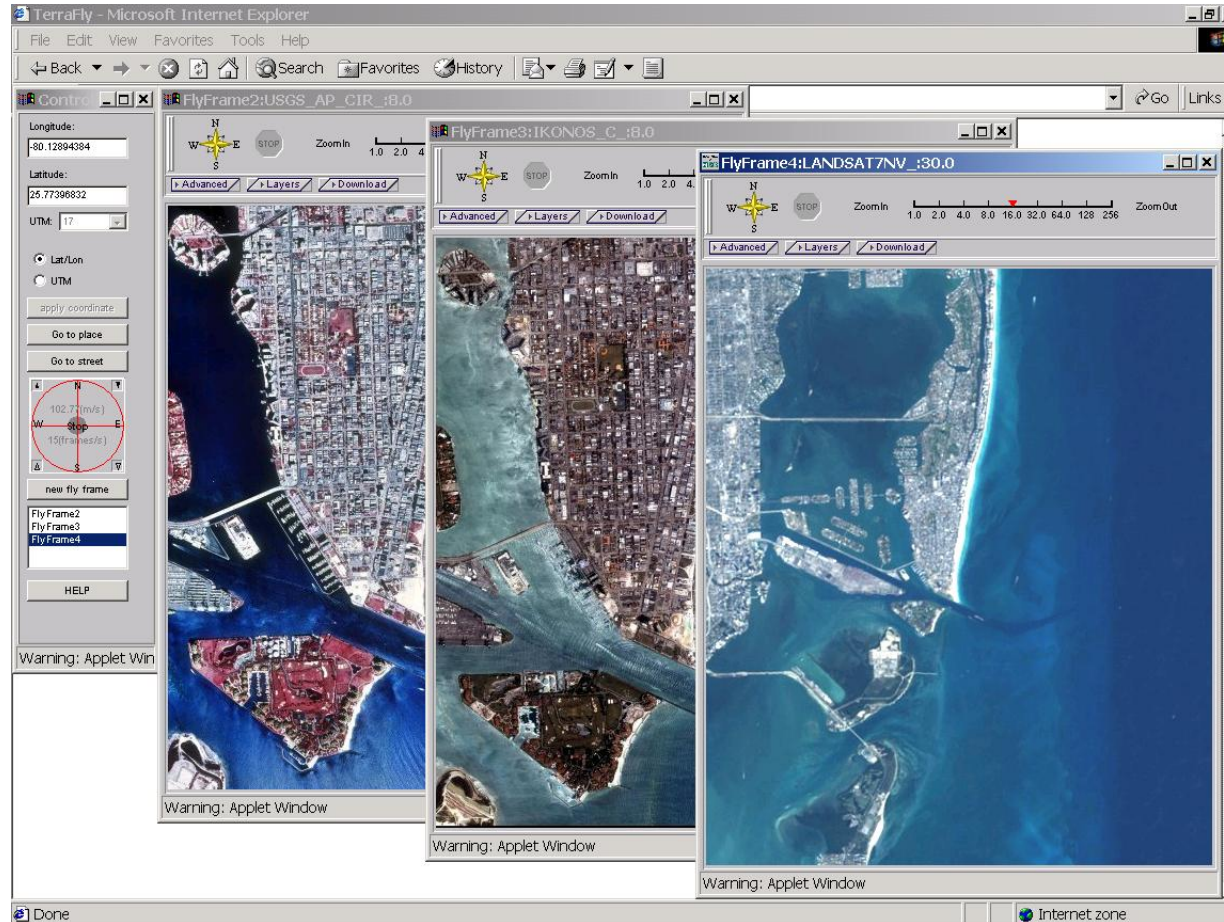
# smooth flight over spatial data

- Streaming incremental tiles to a Java applet allows users to “fly” over data





multiple windows

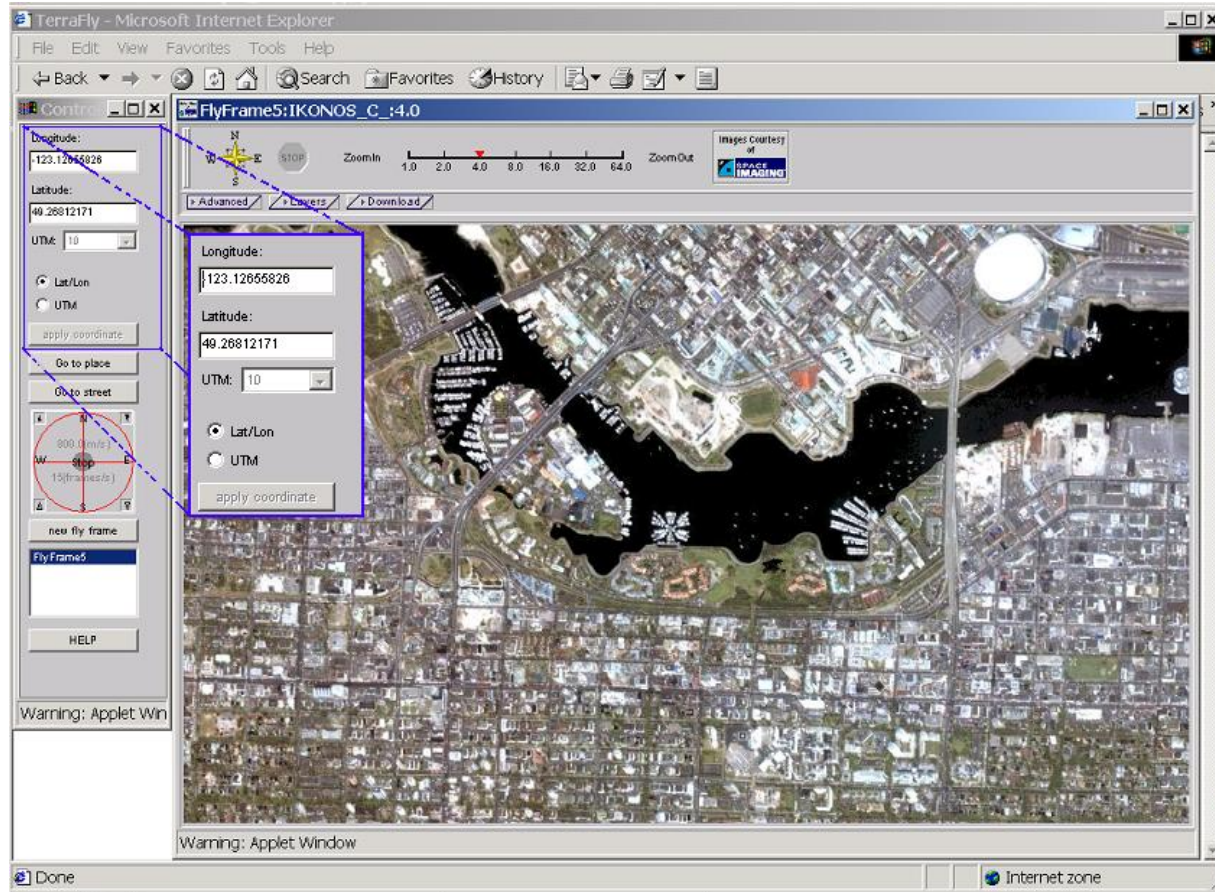


- Multiple data type support





# geolocation ID



- Updates geographical coordinates as you “fly”
- Provides a Go-To coordinate feature







go to place

- Go-To a specific place of interest using its name

Warning: Applet Window

	Longitude	Latitude	Distance	PlaceName	County	State	PlaceType
1	81.783	24.655	0.304	Key West	Monroe	FL	ppl
2	81.81	24.548	1.625	Fort Taylor	Monroe	FL	ppl

Warning: Applet Window





# place identifier

Warning: Applet Window

Warning: Applet Window

Warning: Applet Window

X:	324283.118
Y:	4306700.357
Zone:	18
North:	true
Longitude:	-77.0260787
Latitude:	38.8916167
Distance:	0.041
Placename:	National Museum of building
Distance_PPL:	0.67
Placename_PPL:	Chinatown (subdivisi
County:	District of Columbia
State:	DC

- Find the closest place of interest and populated place

- Find the exact coordinates of any point in the image, even during flight





# address lookup

- Find the coordinates and Go-To a specific street address

The screenshot shows the TerraFly web application interface. A 'GotoStreet' dialog box is open, displaying a table of search results for the address '11200 SW 8 St' in Miami, FL. The table has columns for StreetAddress, City State and Zip, Longitude, and Latitude. The first row shows the address '11200 SW 8 St' with coordinates '80.377' and '25.761'. The dialog box also includes input fields for StreetAddress, City, State, and Zip Code, and buttons for Query, OK, and Close.

StreetAddress	City State and Zip	Longitude	Latitude
11200 SW 8 St	Miami FL	80.377	25.761





# zoom in / zoom out

The image displays five overlapping screenshots of the TerraFly application, demonstrating the zoom functionality. Each window shows a different zoom level of the same city area:

- Top Left:** FlyFrame6:IKONOS\_C :1:0 (Lowest zoom)
- Middle Left:** FlyFrame6:IKONOS\_C :2:0
- Center:** FlyFrame6:IKONOS\_C :4:0
- Middle Right:** FlyFrame6:IKONOS\_C :8:0
- Bottom Right:** FlyFrame6:IKONOS\_C :16:0 (Highest zoom)

Each screenshot includes a control panel with the following elements:

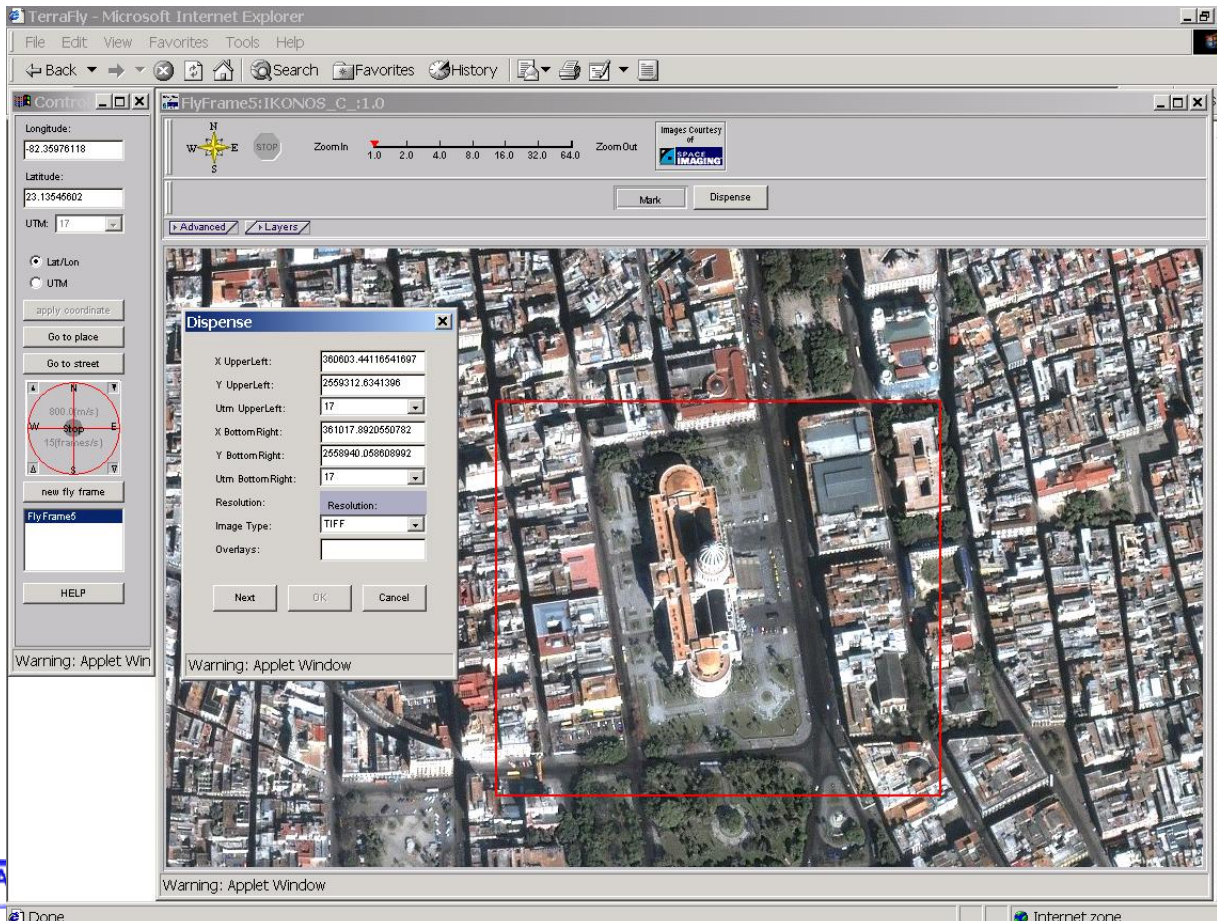
- Longitude and Latitude input fields.
- UTM coordinate input field.
- Radio buttons for Lat/Lon and UTM.
- Buttons: "apply coordinate", "Go to place", "Go to street", "new fly frame", "FlyFrame6", and "HELP".
- A zoom slider with "ZoomIn" and "ZoomOut" buttons.
- A "Warning: Applet Win" message at the bottom.

- Zoom in or out to different resolutions





# downloading data

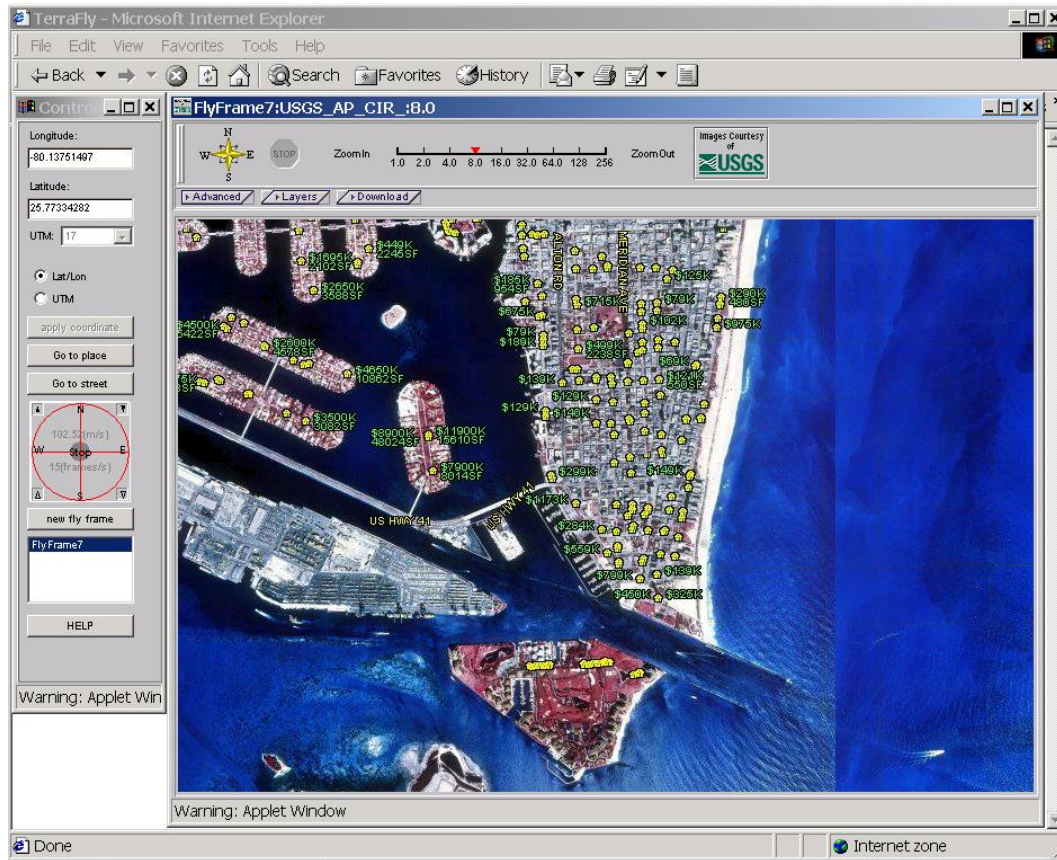


- Select an area of interest with our easy to use GUI
- Receive the data in your choice of file format and media





# information overlay



airport



hotel



beach



park



church



real estate



hospital



school



- Features from the DB can be highlighted
- Data can be overlaid with different sources





# real estate

Warning: Applet Window

Place Name	Street Address	UnitN	City	State	Zip
IL	1455				
VILLAGGIO	OCEAN 1210		MIAMI	FL	33
ON SOUTH	DR.		BCH		
BEA					

- Real Estate Listings information
- Full brochure available on line






# hotels


Warning: Applet Window

Place Name	Street Address	City	Rating	Currency
FONTAINEBLEAU HILTON	4441 COLLINS AVE.	MIAMI BEACH, FL 33140	3.0	USD


**Guest Room**



**Pool**



**Exterior**



- Access to detailed hotel information and reservations link

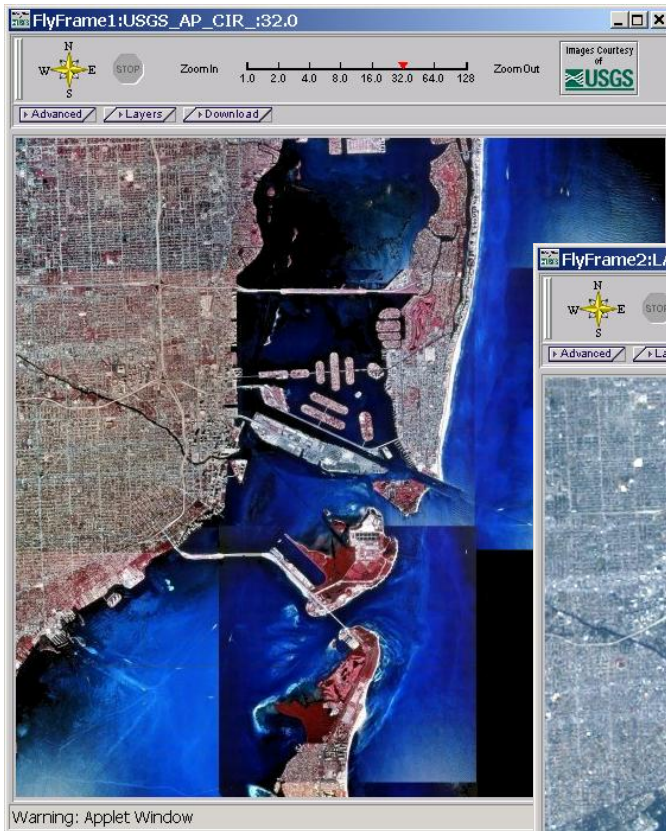




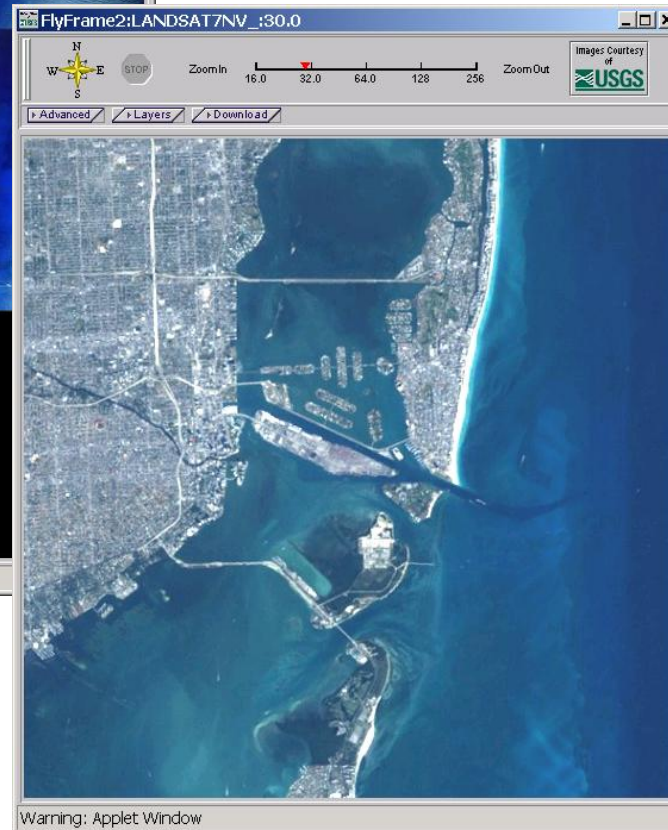




# fly over US



- Through USGS CRADA we have access to entire US Aerial Photography



- Landsat 7 data over Populated Global Landmass





## internet connectivity

- DS3 45 Mbps to the Internet
- OC3 155 Mbps to Internet-2
- NAP 1000 Mbps to Tier 1 ISPs
- Ampath four DS3 45 Mbps to Latin America (Chile, Argentina and 2 to Brazil)
- 1 TB at NAP  $\xrightarrow{155 \text{ Mbps}}$  20 TB at HPDRC





## AmPath benefits

- Bandwidth Intensive Application
- High Bandwidth client = Positive TerraFly Experience
- AmPath will enhance the TerraFly experience to South and Central America clients
- Achieved 33 Mbps sustained data transfer rate between USGS EROS Data Center in Sioux Falls, North Dakota and FIU via Internet 2

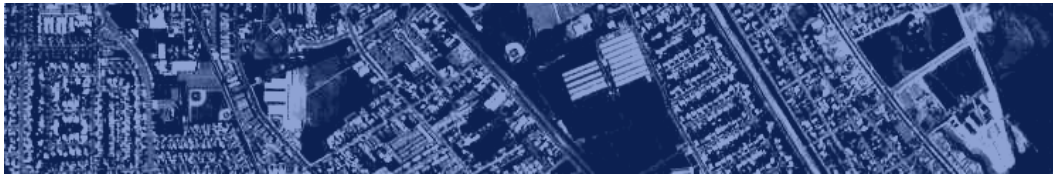




## project status

- USGS CRADA Agreement in Place
- Powerful IBM Servers to house terabytes of data
- Complete US coverage within 1 year
- Global landmass to follow
- Media event held at FIU in late October 2001
- 10,000 unique users per day to TerraFly web site





# flagship project

▪ **TerraFly** has had extensive media coverage.





# experience TerraFly

- at TerraFly.fiu.edu or www.TerraFly.com

