

# LAR-IAC

## GIS Image Processing

### Examples

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# LAR-IAC

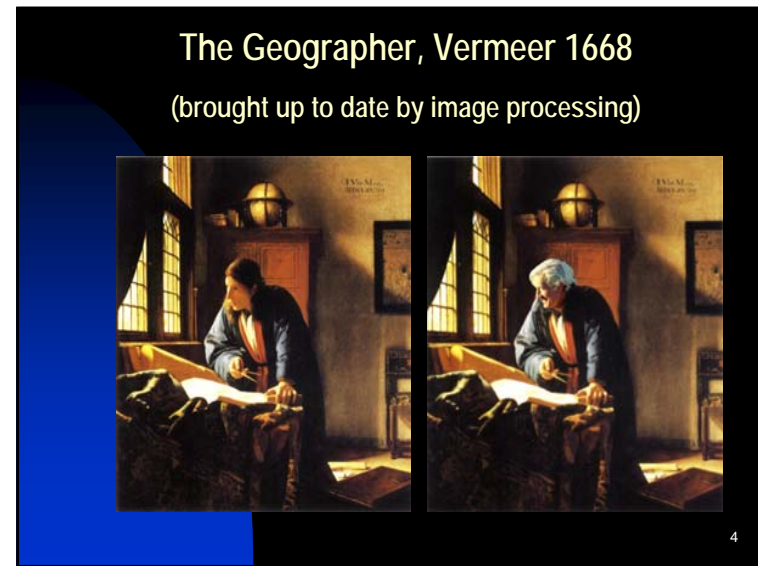
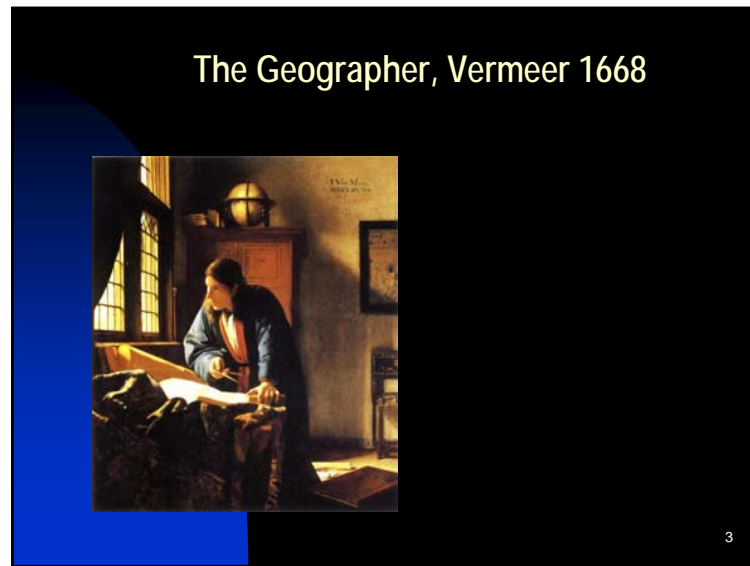
## GIS Image Processing

### Examples

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Consultant for  
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## Outline of Presentation

- Fly-Thru Video
- CIR & Multispectral Bands
- 3D Terrain Visualization

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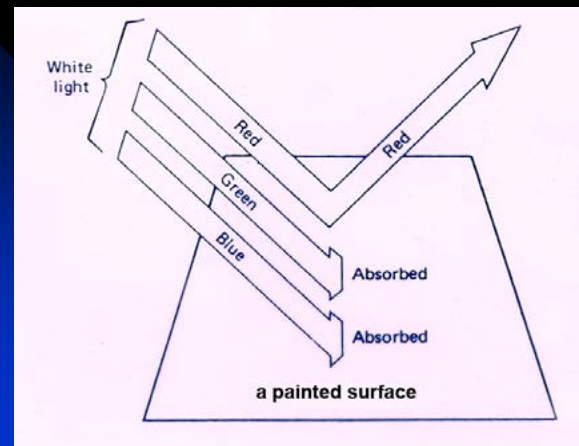


## Part 1

### Multispectral Image Bands

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### Why is a "red car" red?



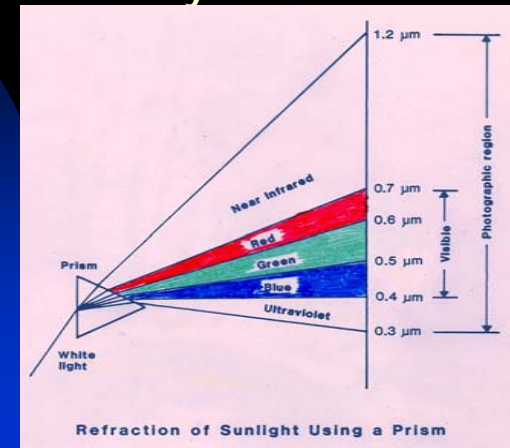
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## Why bother with Infrared ?

- Better atmospheric penetration
- Much better land/water contrast
- Much better vegetation differentiation
- Reveals unique differences between different kinds of surfaces

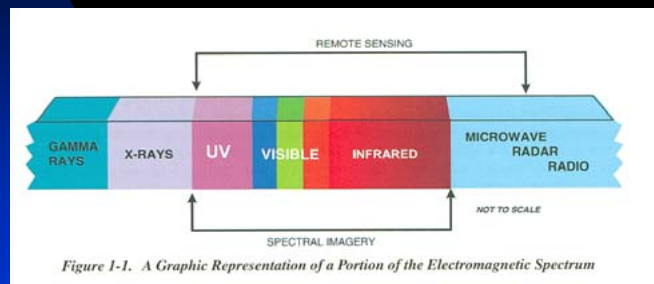
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## Refraction of Light by a Prism



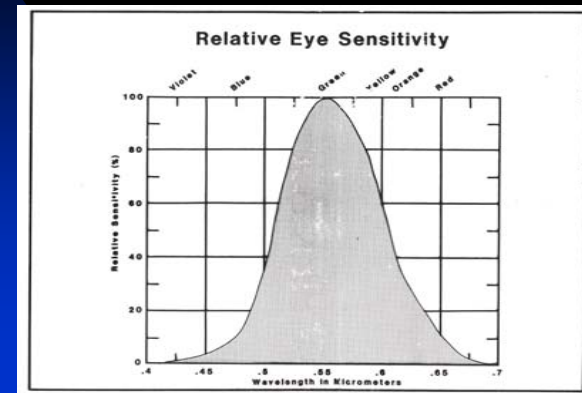
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## The Electromagnetic Spectrum



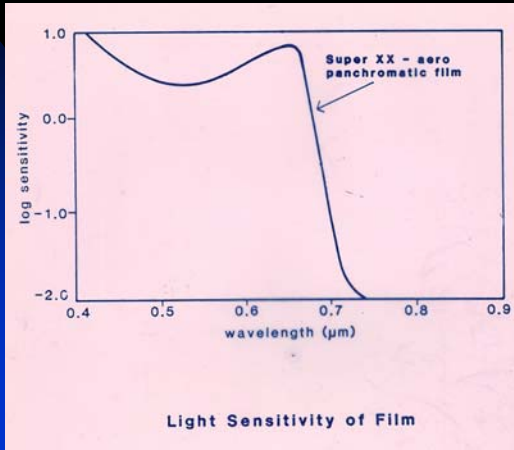
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## Sensitivity of the Human Eye



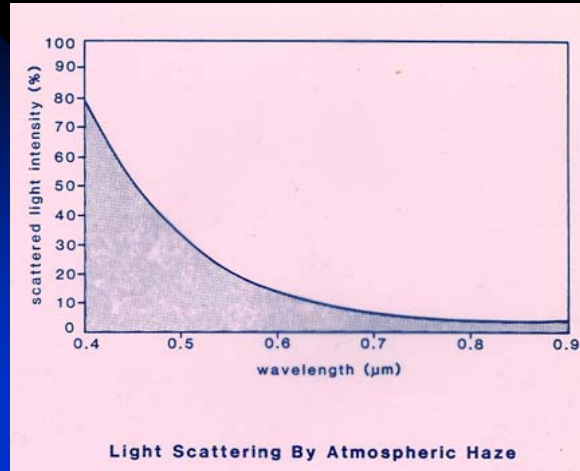
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## Aerial Film Sensitivity



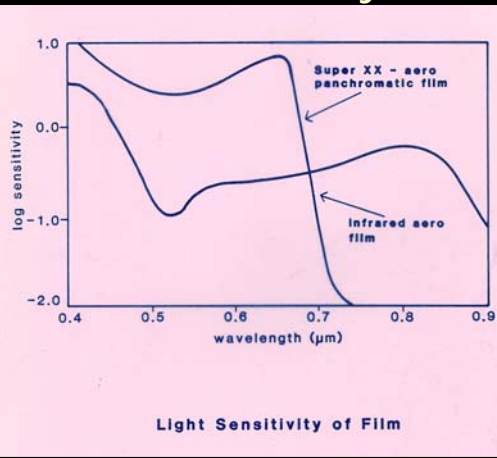
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## Haze Scattering of Light



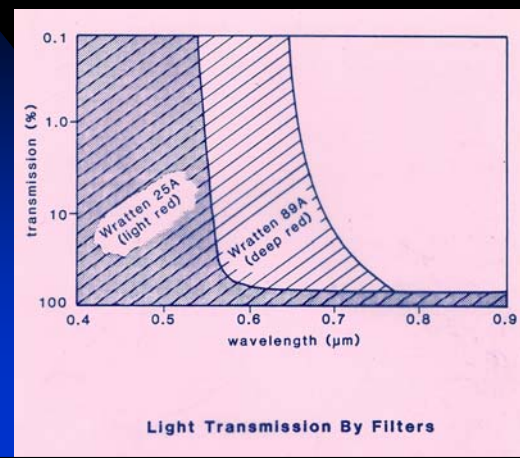
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## Pan & Infrared Film Sensitivity



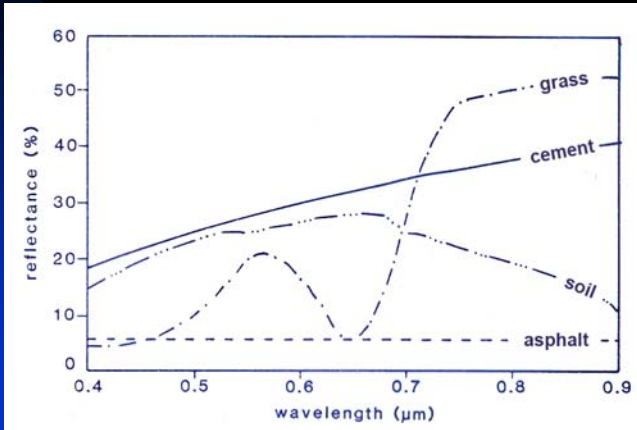
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## Red Filters in Aerial Photography



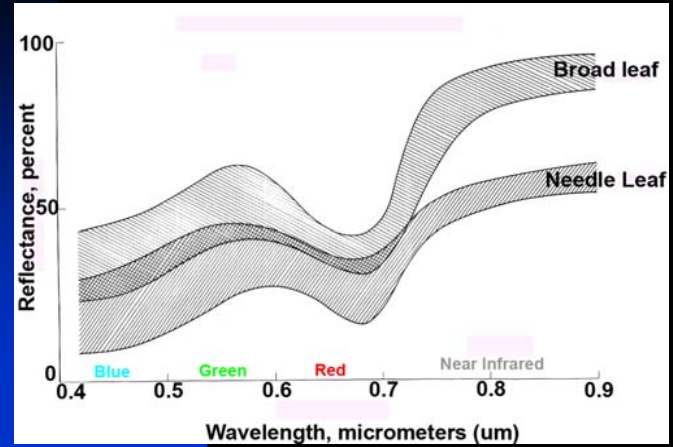
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### Example Spectral Reflectance Curves



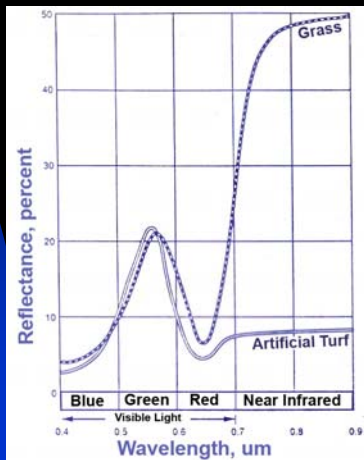
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### Reflection from Vegetation



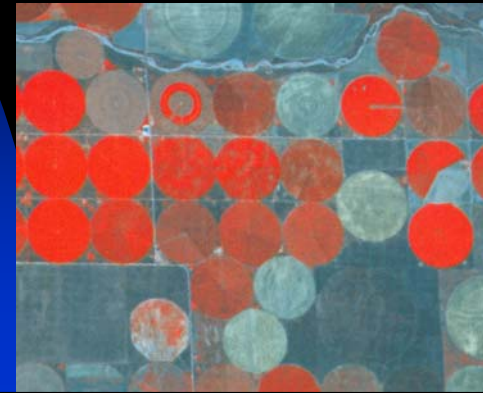
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### Reflection from Grass vs. Artificial Turf



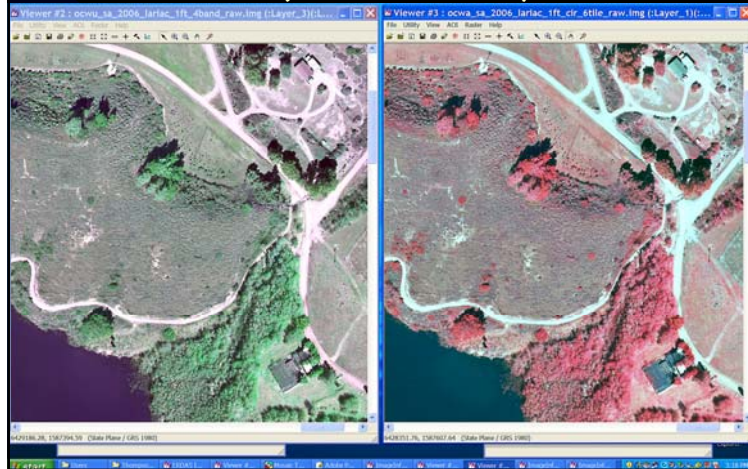
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### Center-Pivot Agriculture in Kansas from Space (SPOT Image)

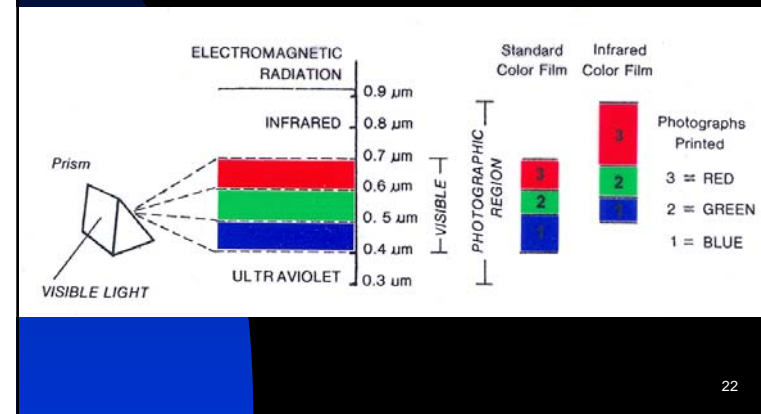


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## LARIAC Color vs. CIR (from 4-Band file)

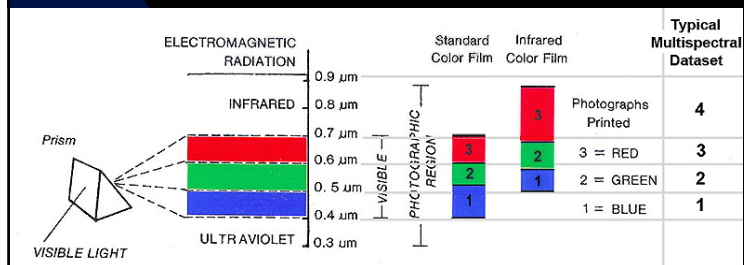


## Color and Color IR Films



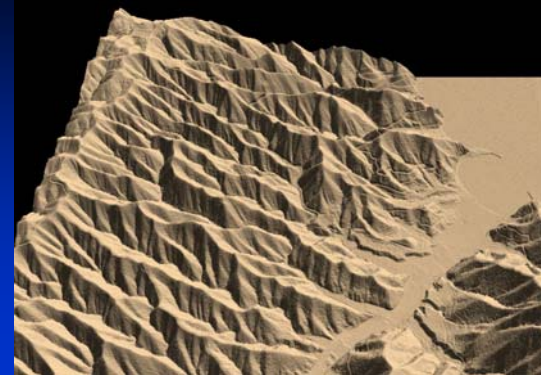
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## Creating a 4-Band LAR-IAC Dataset




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## Part 2 3D GIS Terrain Visualization

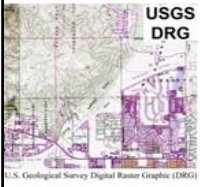


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## Typical Data Layers for 3D Terrain Visualization



USGS DEM  
U.S. Geological Survey Digital Elevation Model (DEM)



USGS DRG  
U.S. Geological Survey Digital Raster Graphic (DRG)

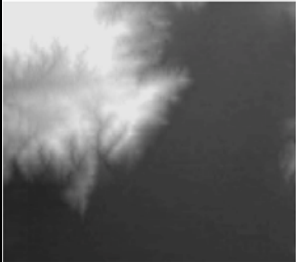


USGS DOQ  
U.S. Geological Survey Digital Orthophoto Quarter Quad (DOQQ)

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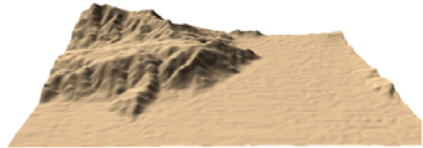
## Creating a 3D Perspective Surface

2D



J.S. Geological Survey Digital Elevation Model (DEM)

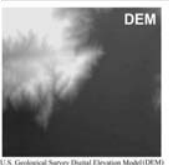



3D



3D Projection of DEM

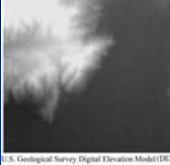



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## "Image Draping" of a GIS layer over the 3D Terrain

2D	3D
<p>DEM</p>  <p>U.S. Geological Survey Digital Elevation Model (DEM)</p>	 <p>3D Projection of DEM</p>
<p>DRG</p>  <p>U.S. Geological Survey Digital Raster Graphic (DRG)</p>	 <p>3D Projection of DEM, with DRG Draps</p>

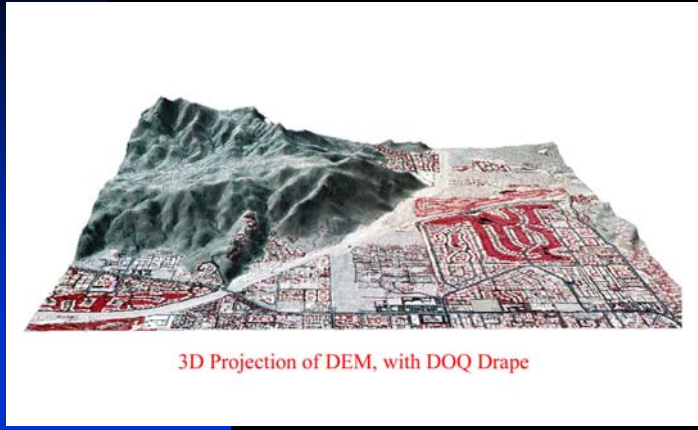
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## Image Draping of the USGS Digital Orthophoto Quarter Quad (DOQQ)

2D	3D
 <p>U.S. Geological Survey Digital Elevation Model (DEM)</p>	 <p>3D Projection of DEM</p>
 <p>U.S. Geological Survey Digital Orthophoto Quarter Quad (DOQQ)</p>	 <p>3D Projection of DEM, with DOQ Draps</p>

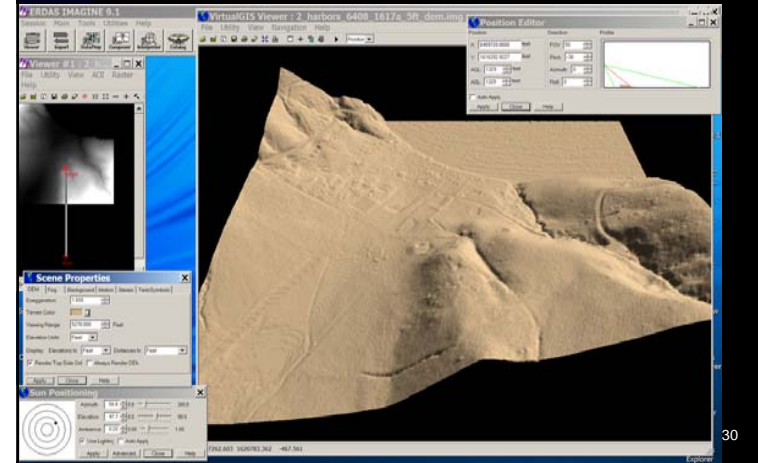
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## CIR DOQQ Drape Result: Palm Springs, CA



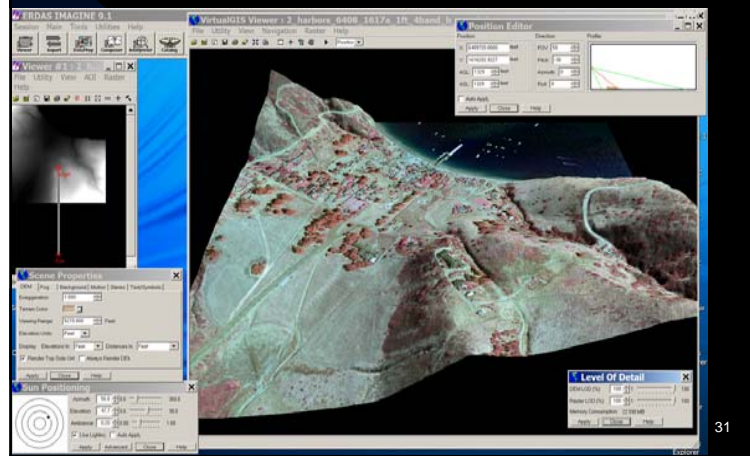
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## Software Controls over the 3D Perspective Surface



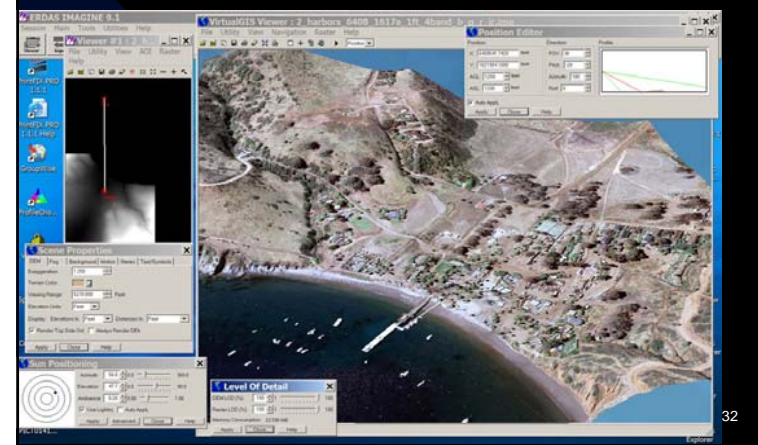
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## Draping the LAR-IAC CIR Data Layer over the Model



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## Optimizing the 3D View



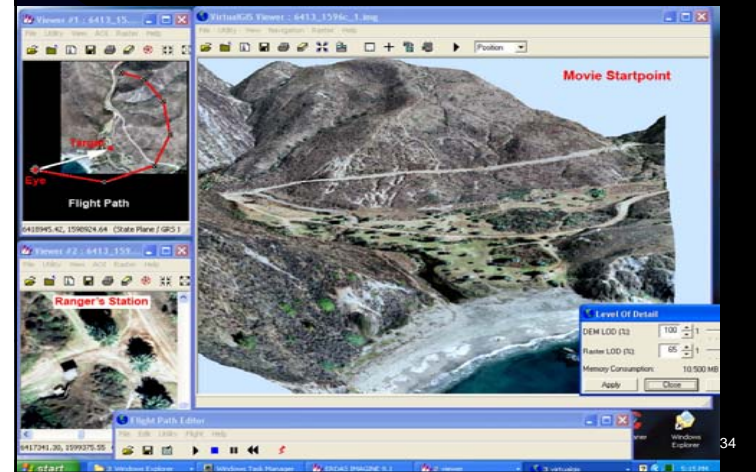
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## The Isthmus: The Result



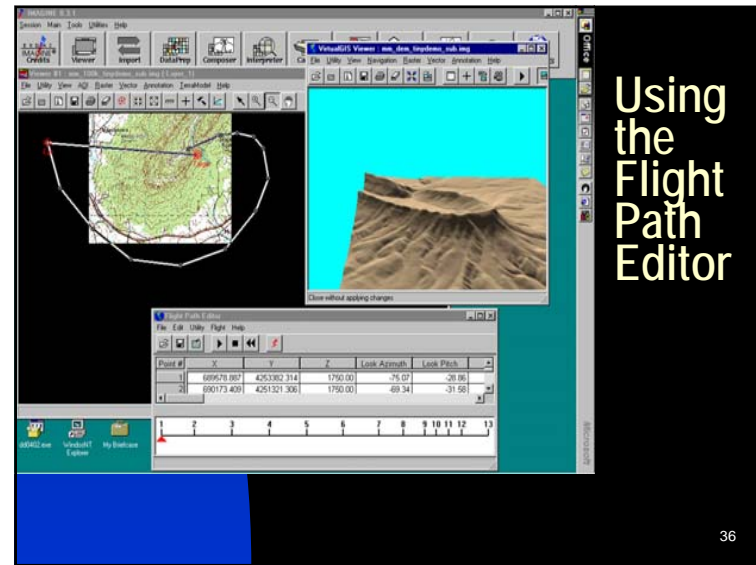
## Creating the Fly-Thru Movie



## Shark Harbor & Little Harbor in Winter



## Using the Flight Path Editor

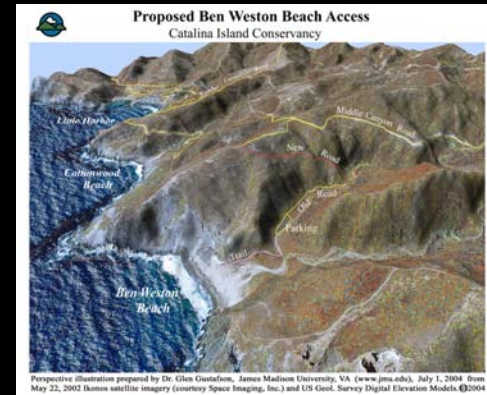


## Avalon LAR-IAC DEM Movie



## 3D Perspective View Created to Illustrate Proposed Road

- The elevation Model has been reprojected, looking North
- The satellite image has been draped over the upper surface
- This could be imagined as one frame of a video fly-thru !



Small text at the bottom of the image: Perspective illustration prepared by Dr. Glen Gustafson, James Madison University, VA (www.jmu.edu), July 1, 2004. from May 22, 2002 IKONOS satellite imagery (courtesy Space Imaging, Inc.) and US Geol. Survey Digital Elevation Models. Q2004

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## 3D View of the Beaches (looking East)

- Existing roads in yellow
- Proposed road in red
- Overall portrayal of the project region is understandable to the public



Small text at the bottom of the image: Perspective illustration prepared by Dr. Glen Gustafson, James Madison University, VA (www.jmu.edu) using May 22, 2002 1-meter IKONOS satellite imagery (courtesy of Space Imaging, Inc.) and 5-meter Digital Terrain Model; s/w: ERDAS GIS

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## Thank You!

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