

## Obtaining Data Remotely

Physical features

- Reflected light
- Elevation
- Electromagnetic spectrum
- Electrical conductivity
- Gravitational attraction
- Propagation of sound waves

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## Ways to obtain the data

- Aerial photos
- Forms of radar
- Sattelite images
- Gravity surveys
- Magnetic surveys
- Seismic surveys

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## Representing data

Two main ways

- Raster data
  - Made of individual bits of data that form a whole
  - Large files
- Vector data
  - Can be described mathematically
  - Smaller files
  - Can be scaled easily

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## Programs for handling raster data

- Adobe Photoshop, Paintshop Pro, Imageplus, Paint
  - Digital pictures (RAW, tiff, and jeg formats)
  - Scanned images (tiff or jpeg)
  - Stored as pixels---requires space for each point
  - May be compacted, such as jpeg files
- Color depth refers to the number of possible colors that can be present in a picture.
  - How many colors would 8-bit color depth allow?

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## Programs for handling vector formats

- Adobe Illustrator, Autocad, Corel Draw, Drawplus
  - ▶ A variety of shapes and fills are available
  - ▶ Instead of storing the resulting image, a mathematical description is stored
  - ▶ Enlargements are as smooth as reductions
  - ▶ Layers are common

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## Programs that handle both

To some degree

- Presentation programs such as Powerpoint
  - ▶ Can import raster images
  - ▶ Drawing tools are vector type
  - ▶ Lack precision tools for technical drawing
  - ▶ Can be used for pulling together into a poster images and drawings created in other programs

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## Resolution

- Resolution refers to the amount of information represented by one pixel
  - ▶ Vector data has no resolution
  - ▶ Resolution combined with color depth determines file size

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## USAPhotoMaps

Background

- Much data is available to the public for free
  - ▶ Maps created by government agencies
  - ▶ Many satellite images and aerial photos
- USAPhotoMaps makes getting this data simpler (as did Google Earth)

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## USAPhotoMaps

Data

- **Topo maps**
  - Scanned images of USGS maps
  - 4m per pixel maximum resolution
- **Aerial photos**
  - Scanned photos from low-level flights
  - 1m per pixel maximum resolution
- **Georeferenced**
  - Lat-long
  - UTM

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## USAPhotoMaps

Tasks for today

- **Locate where you live on an aerial photo**
  - Create a jpeg
  - Import it into Powerpoint
  - Annotate it with words and arrows
- **Find Horseshoe Bluff in the Mines of Spain**
  - Create jpeg files of both Topo and Photo views
  - Import them into Powerpoint and annotate them
- **Find Swiss Valley Nature Preserve**
  - Create and import into Powerpoint jpeg files of both Topo and Photo Views
  - Use them to create your own map of at least one trail and the visitor center

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