

CEIE 410/510: GIS in Engineering, Fall 2009

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PROCESSING RASTER-BASED DATA



Raster Categories

- Generic raster file
 - ASCII or Binary
- Raster data interchange format
 - Portable between organizations and GIS apps
 - Most popular: TIFF (tagged image file format)
 - GeoTIFF: TIFF with georeferencing



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Raster Categories (2)

- Raster data compression format
 - Ex: RLC, GIF, JPEG
 - Compression ratios: 5:1 to 10:1
 - MrSID (Multiresolution Seamless Image Database) C/R: 20:1 to 50:1
- Remote sensing image formats
 - LandSat MSS
- Proprietary formats
 - ArcInfo: GRID



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Remote Sensing Image Formats

- Bands
 - Satellite Photo data: multiband
- Band Sequential (BSQ) format
 - Each image band is kept as a separate file
- Band interleaved by Pixel (BIP)
- Band Interleaved by Line (BIL)
 - Pixels of each band are recorded by band-by-band of each row (or line) of the image
 - Allows images to be displayed w.r.t. map coordinate system and allows integration with other vector and raster data



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Adv: Raster Over Vector

- Can represent diff type of continuous surfaces
- Computing/processing is fast
- Surface data: faster to display
- Tiling facilitates easy handling of large data
- Only solution for some applications that cannot be handled by vector
 - Hydrologic modeling, spread of wild fires, air pollution dispersion etc



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Acquiring Raster Data

- USGS raster sources
 - DOQ
 - DRG
 - DEM
- Remote sensing
- Aerial imaging



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Georeferencing Raster

- Image-to-map rectification
 - Raster cells to map coordinate reference
- Image-to-image rectification
 - New image to a known image

Raster Data Editing

- Filling holes and gaps
- Edge smoothing or boundary simplification
- Deskewing
- Speckle removal or filtering
- Erase and delete
- Thinning
- Clipping
- Drawing and rasterization

Raster-based Analysis

- Logical Operations
- Arithmetic Operations
- Overlay Operations
- Geometric Property Operations
- Geometric Transformation Operations
- Geometric Deviation Operations