

## *GEOCODING*

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## *DEFINITION OF GEOCODE*

- *Identifier assigned to both a map feature and to a data record containing attributes that describe the entity represented by the map feature*
  - *Also referred to a "location identifiers"*

– From William Huxhold,  
An Introduction to Urban Geographic Information Systems

## *LOCATIONAL GEOCODES*

- *Standard vs. Arbitrary*
  - *Disadvantages of arbitrary system*
    - *Incompatibility*
    - *Inability to document the alternative systems*
    - *Can't adapt to new levels of precision*
    - *Assume specific map projection*
- *Important element -- universality*

## *GEOGRAPHIC COORDINATES*

- *Latitude*
  - *Ranges from 0° (Equator) to 90° (Poles)*
  - *Positive in northern hemisphere, negative in south*
- *Longitude*
  - *Ranges from 180° East/West*
  - *Positive in east, negative in west*

## UNIVERSAL TRANSVERSE MERCATOR -- UTM

- Divides earth into pole-to-pole strips or zones -- 6° wide
- First zone starts at International Date Line and runs east
  - Zones increase in number from west to east
- Each zone consists of Transverse Mercator projection centered on middle of zone -- Central Meridian

## CIVILIAN UTM ZONE

- Single grid for each zone
- For southern hemisphere, zero northing coordinate is South Pole
- For northern hemisphere, zero northing coordinate at Equator
- Customary to limit projection between 84°N - 80°S
  - Use Universal Polar Stereographic

## CIVILIAN UTM ZONE

- False origin -- Central Meridian given easting of 500,000 m
- Overlap of about 1/2 degree
- Gives all eastings positive value
- Can tell location of point wrt Central Meridian

## GEOCODING USING UTM COORDINATES

- 16 digits stores location to precision of 1 meter
- Advantage of system
  - Plane approximation can be used safely over small regions
  - Level of precision adaptable to application

## MILITARY UTM COORDINATE SYSTEM

- Zones numbered 1-60 west to east
- 8° strips of latitude lettered from C to X
  - X has extended strip from 72° - 84°N
  - A, B, Y, Z reserved for Universal Polar Stereographic projection
    - A, B -- South Pole -- A for west between 0°-180°
    - Y, Z -- North Pole -- Y for west between 0°-180°
- 6° x 8° rectangle fall in about 1,000 km square - designated by numbers & letters

## MILITARY UTM COORDINATE SYSTEM

- Each grid subdivided into squares 100,000 m on side
  - Assigned two additional letter identifiers
  - Letters start at A, go to Z starting at zone 1 and repeat every 18°
    - Note, I and O are not used
  - Letters from A to V, increasing North from Equator. For southern hemisphere, start at V at Equator and cycle backwards to A

## MILITARY UTM COORDINATE SYSTEM

- 100,000 grid subdivided into successively smaller sizes with x, y digits
  - 2 digits -- 10,000 m grid (eg 18TWC 81)
  - 4 digits -- 1,000 m grid (18TWC 8713)
  - 6 digits -- 100 m grid (18TWC 873134)

## STATE PLANE COORDINATE SYSTEM -- SPC

- Based on coordinate systems for each state
  - Lambert Conformal Projection used for states with predominant East-West extent
  - Transverse Mercator used for states with predominant North-South extent
- Designed to keep distortions to 1:10,000 or less