CHAPTER 5 GIS DATA Acquisition

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Existing GIS Data

Federal Geographic Data Committee
http://www.fgdc.gov/
Geospatial One-stop
http://www.geodata.gov/
U.S. Geological Survey: National Map
http://geography.usgs.gov/
National Land Cover Data 1992
http://landcover.usgs.gov/
USGS DEMs download sites: GIS Data Depot
http://data.geocomm.com/
USGS DEMs download sites: Map-Mart
http://www.mapmart.com/
USGS DEMs download sites: LAND INFO International
http://www.atdi-us.com/
National Elevation Data set (NED)
http://ned.usgs.gov/ned/

AmericaView
http://americaview.usgs.gov/
OhioView
http://www.ohioview.org/
U.S. Census Bureau
http://www.census.gov/
Natural Resources Conservation Service
http://soils.usda.gov/
Montana GIS data clearinghouse
http://www.nris.state.mt.us/
Greater Yellowstone Area Data Clearinghouse
http://sun1.giac.montana.edu/gyadc/gyadchome.html
San Diego Association of Governments
http://www.sandag.cog.ca.us/
Clackamas County, Oregon
http://www. clackamas. us/gis/

Metadata

- Metadata provide information about geospatial data. They are therefore an integral part of GIS data and are usually prepared and entered during the data production process.
- Metadata are important to anyone who plans to use public data for a GIS project.

Conversion of Existing Data

- Data conversion refers to the mechanism for converting GIS data from one format to another.
- Data conversion includes direct translation and use of neutral format.

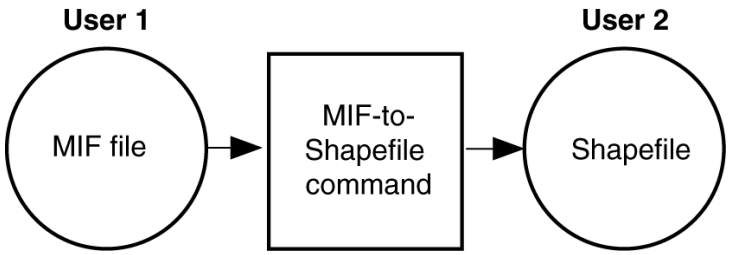

Figure 5.1
The MIF to Shapefile tool in ArcGIS converts a MapInfo file to a shapefile.

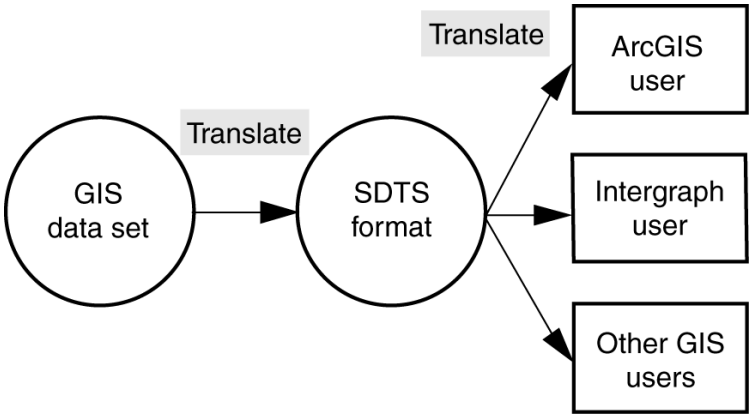

Figure 5.2
To accommodate users of different GIS packages, a government agency can translate public data into a neutral format such as SDTS format. Using the translator in the GIS package, the user can convert the public data into the format used in the GIS.

Creating New Data

A variety of data sources and methods can be used to create new data:

1. Remotely sensed data
2. Field data (survey data and GPS data)
3. Text files with *x*-, *y*-coordinates
4. Digitizing using a digitizing table
5. Scanning
6. On-screen digitizing

Figure 5.3
A digital orthophoto (DOQ) can be used as the background for digitizing or updating of existing maps.

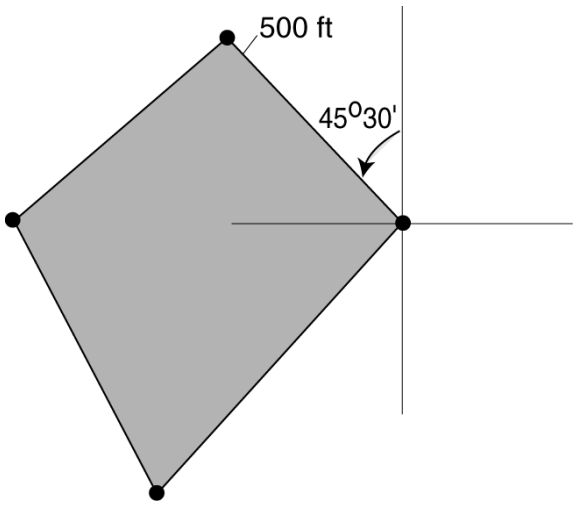

Figure 5.4
A bearing and a distance determine a course between two stations.

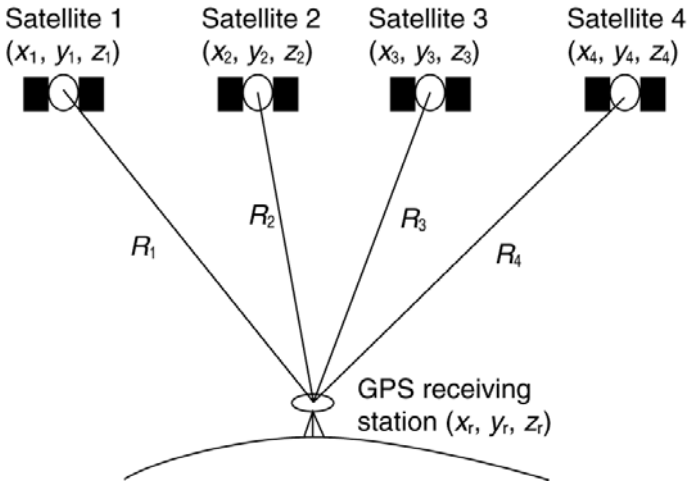

Figure 5.5
Use four GPS satellites to determine the coordinates of a receiving station. x_i, y_i, and z_i are coordinates relative to the center of mass of the Earth. R_i represents the distance (range) from a satellite to the receiving station.

Figure 5.6
A portable GPS receiver. (Courtesy of Trimble.)

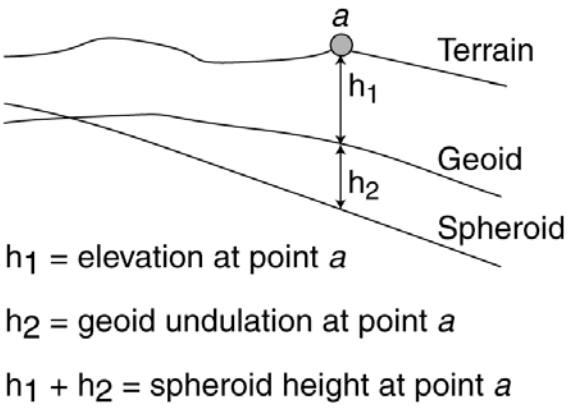

Figure 5.7
Elevation readings from a GPS receiver are measured from the surface of the geoid rather than the spheroid.

Figure 5.8
A large digitizing table and a cursor with a 16-button keypad. (Courtesy of GTCO Calcomp, Inc.)

Manual Digitizing

Many GIS packages have a built-in digitizing module for manual digitizing. The module is likely to have commands that can help move or snap a feature (i.e., a point or line) to a precise location in relation to another feature either in the same layer or a different layer.

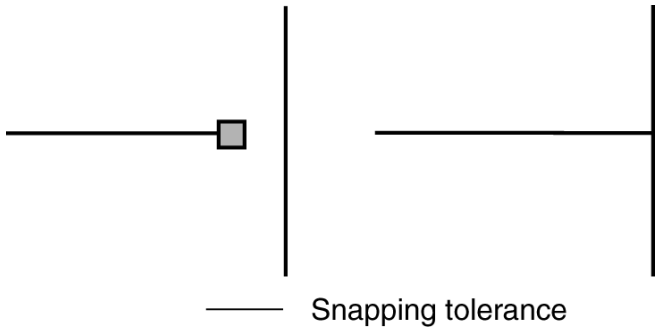

Figure 5.9
The end of a new line can be automatically snapped to an existing arc if the gap is smaller than the specified snapping tolerance.

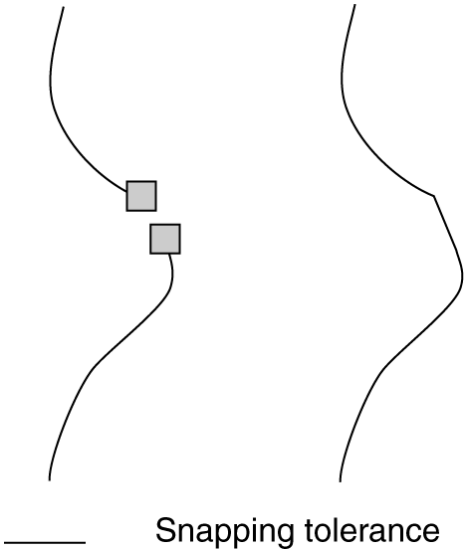

Figure 5.10
A point (node or vertex) can be automatically snapped to another point if the gap is smaller than the specified snapping tolerance.

Figure 5.11
Large format drum scanners. (Courtesy of GTCO Calcomp, Inc.)

Scanning

- Scanning is a digitizing method that converts an analog map into a scanned file, which is then converted back to vector format through tracing.
- Results of tracing depend on the robustness of the tracing algorithm that is built in the GIS package. Examples of problems that must be solved by the tracing algorithm include: how to trace an intersection, where the width of a raster line may double or triple; how to continue when a raster line is broken or when two raster lines are close together; and how to separate a line from a polygon.

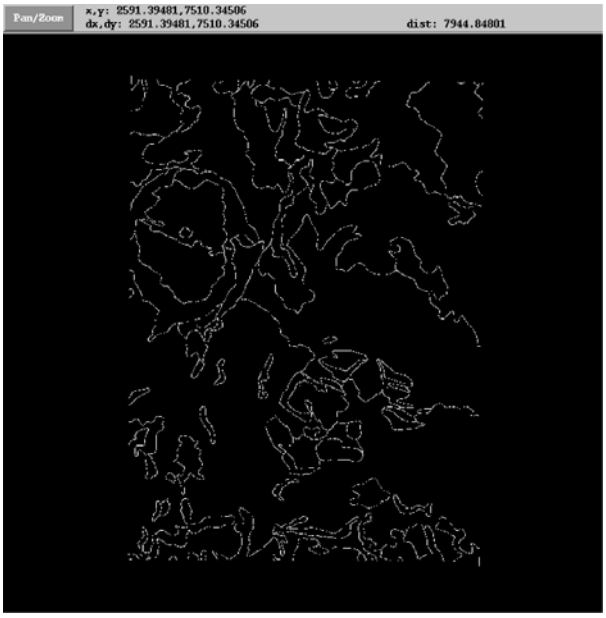

Figure 5.12
A binary scanned file: the lines are soil lines, and the black areas are the background.

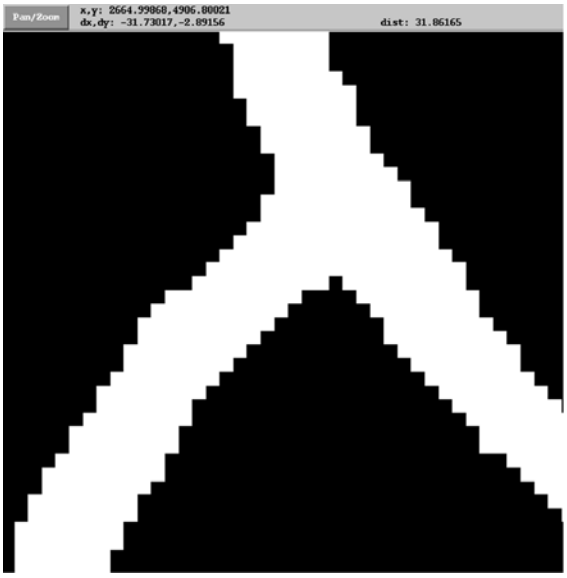

Figure 5.13
A raster line in a scanned file has a width of several pixels.

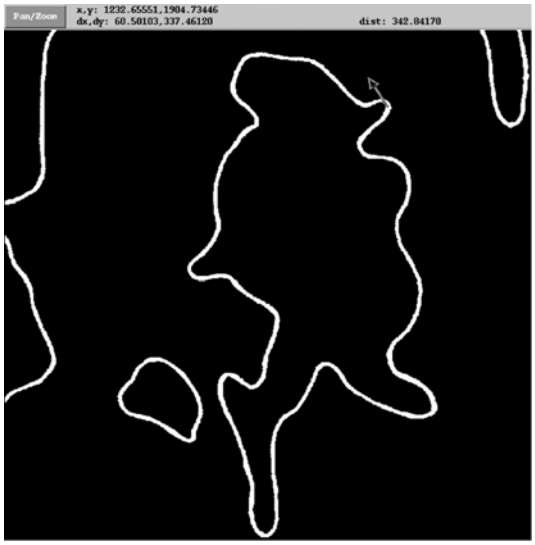

Figure 5.14
Semiautomatic tracing starts at a point (shown with an arrow) and traces all lines connected to the point.

Figure 5.15
The width of a raster line doubles or triples when lines meet or intersect.

Framework data
http://www.fgdc.gov/framework/frameworkoverview/
Federal Geographic Data Committee
http://www.fgdc.gov/
Geospatial One-stop
http://www.geodata.gov/
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National Elevation Data set (NED)
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OhioView
http://www.ohioview.org/
Soils data at the Natural Resources Conservation Service
http://soils.usda.gov/
U.S. Census Bureau
http://www.census.gov/
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http://www.nris.state.mt.us/
Greater Yellowstone Area Data Clearinghouse
http://sun1.giac.montana.edu/gyadc/gyadchome.html
San Diego Association of Governments
http://www.sandag.cog.ca.us/
Clackamas County, Oregion
http://www.clackamas.us/gis/
Geography Network
http://www.geographynetwork.com/
Tele Atlas North America
http://www.teleatlas.com/
NAVTEQ
http://www.navteq.com/
LAND INFO International
http://www.landinfo.com/

FGDC metadata
http://www.fgdc.gov/metadata/geospatial-metadata-standards
Spatial Data Transfer Standard
http://mcmcweb.er.usgs.gov/sdts/
National Geospatial-Intelligence Agency
http://www.nga.mil/
International Steering Committee for Global Mapping
http://www.iscgm.org/cgi-bin/fswiki/wiki.cgi
USGS Geographic Data Download website
http://edc.usgs.gov/geodata/
NAVSTAR
http://gps.losangeles.af.mil/jpo/
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http://www.glonass-center.ru/
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Northern California Earthquake Data Center
http://quake.geo.berkeley.edu/
California GIS data clearinghouse
http://casil-mirror1.ceres.ca.gov/casil/