



GIS

Glossary of Terms

Hillsborough County
Geographic Information System

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A

Access rights

The privileges accorded a user for reading, writing, deleting, updating and executing files on a disk. Access rights are stated as `no access`, `read only` and `read/write`.

Accuracy

A measure of the closeness or variability of estimates, observations, computations, markings, etc., of spatial features to their true value of position. Compare with precision.

1. “Absolute accuracy” is the differential between the actual real world location of a point on the surface of the earth and its mathematically assigned geographic coordinate. If a specification calls for the precision to be within one foot, its assigned coordinate value must be within one foot of its actual geographic location as mathematically determined according to the map’s projection.
2. “Relative accuracy” is the displacement of the actual position of a point compared to its “precise” location.

Addressing

The function of government to assign and maintain the proper posting of addresses in the field.

Address matching

A mechanism for relating two files using address as the common item. Geographic coordinates and attributes can be transferred from one address to another. For example, a data file containing student addresses can be matched to a street coverage that contains addresses creating a point coverage of where the students live.

Address processing

An automated process used to determine exact address matching or exact address-to-address matching. Frequently completed by specialized address processing software. Usually more difficult given the lack of address component standardization. Closely related to parsing, which is the processing of a “free-field” address to identify sub-components allowing for matching or merging. Closely related to geocoding.

Algorithm

- (1) A step-by-step problem-solving procedure, especially an established, recursive computational procedure for solving a problem.
- (2) A set of ordered procedures, steps, or rules usually applied to mathematical calculations, and assumed to lead to the solution of a problem in a finite number of steps; the logic (and/or formula) that is used to solve a problem.

Alphanumeric

A combination of alphabetic letters, numbers, and/or special characters. A mailing address is an alphanumeric listing. The designation ljsdoijw92393 is an alphanumeric word. Alphabetic characters consist of letters A through Z. Numeric characters consist of the characters 0 through 9.... Sometimes these characters exclude such things as (or) and *, / and \, which may have specific instructional meaning to a computer’s operating system.

AML

ARC Macro Language. A high-level algorithmic language for generating end-user applications. Includes an extensive set of commands that can be used in programs (macros) as well as commands that report on the status of ARC/INFO environment settings.

Analysis

Analysis is the process of identifying a question or issue, modeling the issue, investigating model results, interpreting the results, and possibly making a recommendation. See model and spatial analysis.

Annotation

1. Descriptive text used to label coverage features. It is used for display, not for analysis.
2. One of the feature classes in a coverage used to label other features. Information stored for annotation includes a text string, the location at which it is displayed, and a text symbol (color, font, size, etc.) for display.

ANSI

American National Standards Institute, a national coordinator of voluntary standards activities, and an approval organization and clearinghouse for consensus standards in the United States. ANSI works closely with international organizations, particularly ISO, for the development and approval of international standards. While ANSI standards apply to every facet of today's world, their efforts in the area of SQL and spatial extensions to SQL are of particular interest to the GIS community.

API

Application Program Interface (API) is a set of system calls or routines for application programs to access services from operating systems or other programs. An API allows your program to work with other programs, possibly on other computers. API is fundamental to client/server computing.

Application

- (1) The use of software, data, procedures, and techniques in a series of steps that are then put into practice to solve a problem or perform a function.
- (2) A computer program, or collection of programs, that are designed to accomplish a specific task or use.

Arc

1. An ordered string of vertices (X,Y coordinate pairs) that begin at one location and end at another. Connecting the arc's vertices creates a line. The vertices at each endpoint of an arc are called nodes.
2. A coverage feature class used to represent linear features and polygon boundaries. One line feature can contain many arcs. Arcs are topologically linked to nodes (arc-node topology) and to polygons (polygon-arc topology). The descriptive attributes of arcs are stored in the arc attribute table (AAT). See also node.

Arc-node topology

The topological data structure ARC/INFO uses to represent connectivity between arcs and nodes. Arc-node topology supports the definition of linear feature and polygon boundaries, and supports analysis functions such as network tracing. See also topology.

Archive

A preserved collection of historical information.

Area

1. A homogeneous extent of the Earth bounded by one or more arc features (polygon) or represented as a set of polygons (region). Examples: states, counties, lakes, land-use areas, and census tracts.
2. The size of a geographic feature measured in unit squares.

ASCII

American Standard Code for Information Interchange. A set of codes for representing alphanumeric information (e.g., a byte with a value of 77 represents a capital M). Text files, such as those created with the text editor of a computer system, are often referred to as ASCII files.

Attribute

1. A characteristic of a geographic feature described by numbers, characters and images, typically stored in tabular format and linked to the feature by a user-assigned identifier (e.g., the attributes of a well might include depth and gallons per minute).
2. A column in a database table.

Attribute table

A file containing rows and columns. In a GIS, attribute tables are associated with a class of geographic features, such as wells or roads. Each row represents a geographic feature. Each column represents one attribute of a feature. See also feature attribute table.

Automated Mapping/Facility Management (AM/FM)

A geographical information system that deals with large-scale spatial databases of buildings and other infrastructure such as utilities and roads.

B

Backup

A copy of a file, a set of files, or whole disk for safekeeping in case the original is lost or damaged.

Bandwidth

A measure of the volume of data that can flow through a communications link. Image data tend to exist as large datasets; thus moving image datasets from one computer to another requires high bandwidth or performance will be slowed. Also known as throughput.

Base map

A map containing geographic features used for locational reference. Roads, for example, are commonly found on base maps. This map generally serves as the resource on which other information is plotted for comparative and geographic correlation purposes. The elements that comprise a Base Map may be unique to the agency utilizing the information

– for example, Parks and Recreation will have a different set of layers than the Building Department – although there is generally one map generated by governmental entities that serves as a Base Map for all uses.

Bit Map

- 1 A data structure in memory that represents data and instructions in the form of a collection of individual bits. A bit map is used to represent a bit image: a sequential collection of bits that represents in memory an image to be displayed on the screen, particularly in systems having a graphical user interface. Each bit in a bit image corresponds to one pixel (dot) on the screen.
- 2 The representation of the blocks of storage on a disk, indicating whether each block is free (0) or in use (1).

BLOB

Binary Large Object. The data type of a column in an RDBMS table which can store large image or textual data as attributes.

Block group

U.S. Census Bureau terminology that refers to a set of Census blocks combined together to provide a small population and housing census area. All selected Census blocks are contained within a single census tract boundary containing an average of population of approximately 800, about one fourth to one fifth the population of a Census tract.

Boolean expression

A type of expression that reduces to a true or false (logical) condition. A Boolean expression contains logical expressions (e.g., $DEPTH > 100$) and Boolean operators. A Boolean operator is a keyword that specifies how to combine simple logical expressions into complex expressions. Boolean operators negate a predicate (NOT), specify a combination of predicates (AND), or specify a list of alternative predicates (OR). For example, $DEPTH > 100$ AND $DIAMETER > 20$.

Browser

An application that allows users to use and explore the Internet. The most common of these are Microsoft's Internet Explore and Netscape Navigator.

Buffer

A zone of a specified distance around coverage features. Both constant and variable width buffers can be generated for a set of coverage features based on each feature's attribute values. The resulting buffer zones form polygons (areas) that are either inside or outside the specified buffer distance from each feature. Buffers are useful for proximity analysis (e.g., find all stream segments within 300 feet of a proposed logging area).

C

CAD

Computer-aided design. An automated system for the design, drafting, and display of graphically oriented information.

CAD drawing

The digital equivalent of a drawing, figure or schematic created using a CAD system. For example, a drawing file or DWG file in AutoCAD.

Cadastre

A public record, survey, or map of the value, extent and ownership of land as a basis of taxation.

Calibration

The process of choosing attribute values and computational parameters so that a model properly represents the real-world situation being analyzed.

Cartography

The science and art of making maps and charts.

Centerline

Linear feature representing the midpoint along a linear element, such as a road or stream.

Centroid

The geometric center of a polygon.

CGM

Computer Graphics Metafile is a graphic image exchange standard, ANSI: x3.122-1986, ISO: 8632-1986, for graphic output file format. ARC/INFO, ArcView Version 2, and PC ARC/INFO support CGM.

COGO

1. Abbreviation of the term COordinate GeOmetry. Land surveyors use COGO functions to enter survey data, to calculate precise locations and boundaries, to define curves, and so on.
2. The name of the ARC/INFO coordinate geometry software product.

Continuous map

A cartographic database that treats the entire mapped area as a single map allowing the user to view any part of the map without opening a new file. This is in contrast to a database that breaks a mapped area into multiple files to minimize file size, just as a larger scale paper map of a city is divided into multiple map sheets.

Contour

A line connecting points of equal surface value. Contour mapping displays such lines, each of which represents a constant value, typically, elevation, throughout its length. Also called isolines.

Contour interval

The difference in surface values between contours.

Coordinate

A set of numbers that designate location in a given reference system, such as X,Y in a planar coordinate system or an X,Y,Z in a three-dimensional coordinate system. Coordinates represent locations on the Earth's surface relative to other locations. See also vector and Cartesian coordinate system.

Coordinate geometry

See COGO.

Coordinate system

1. A two or three-dimensional reference system in which the coordinates of a point in a plane (X,Y), or the coordinates of a point in space (X,Y,Z), are its distances from either two or three perpendicular lines that intersect at an origin.
2. A reference system used to measure horizontal and vertical distances on a planimetric map. A coordinate system is usually defined by a map projection, a spheroid of reference, a datum, one or more standard parallels, a central meridian, and possible shifts in the x- and y-directions to locate X,Y positions of point, line, and area features. A common coordinate system is used to spatially register geographic data for the same area.

Corporate Data

That information maintained in a GIS (either topologically or as part of a set of RDBMS tables and records) that is (1) Owned and/or managed by the entity operating the system, (2) Defined by system governing or management entities to be of inherently critical value, or (3) In its broadest sense, that is inherently useful to the organization.

Coverage

1. A digital version of a map forming the basic unit of vector data storage in ARC/INFO. A coverage stores geographic features as primary features (such as arcs, nodes, polygons, and label points) and secondary features (such as tics, map extent, links, and annotation). Associated feature attribute tables describe and store attributes of the geographic features.
2. A set of thematically associated data considered as a unit. A coverage usually represents a single theme such as soils, streams, roads, or land use.

Coverage extent

The coordinates defining the minimum bounding rectangle (i.e., xmin,ymin and xmax,ymax) of a coverage or grid. All coordinates for the coverage or grid fall within this boundary.

Coverage units

The units (e.g., feet, meters, inches) of the coordinate system in which a coverage is stored.

D

Data access security

Measures taken to control system users' ability to view or modify data. These measures can include logical views of data and explicit access rights by group or individual users.

Database

A logical collection of interrelated information, managed and stored as a unit, usually on some form of mass-storage system such as magnetic tape or disk. A GIS database

includes data about the spatial location and shape of geographic features recorded as points, lines, areas, pixels, grid cells, or tins, as well as their attributes.

Database design

The formal process of analyzing facts about the real world into a structured database model. Database design is characterized by the following phases: requirement analysis, logical design and physical design.

Data conversion

The translation of data from one format to another. These may, for example, involve such data forms as DLG, TIGER, DXF, and DEM, in addition to the software's native information typology.

Data dictionary

A catalog of all data held in a database, or a list of items giving data names and structures. Also referred to as DD/D for data dictionary/directory. Commercial RDBMSs have online data dictionaries stored in special tables called system tables.

Data integrity

Maintenance of data values according to data model and data type. For example, to maintain integrity, numeric columns will not accept alphabetic data. See referential integrity.

Data model

1. The result of the conceptual design process. A generalized, user-defined view of the data related to applications.
2. A formal method of describing the behavior of the real-world entities. A fully developed data model specifies entity classes, relationships between entities, integrity rules and operations on the entities.

Data set

A named collection of logically related data items arranged in a specific manner or format.

Data type

The characteristics of columns and variables that define what types of values they can store. Examples include character, floating point and integer.

Database lock

Locking is a mechanism by which database systems can prevent conflicting access to data when multiple users are making requests to the data.

Database management system (DBMS)

A set of computer programs for organizing the information in a database. A DBMS supports the structuring of the database in a standard format and provides tools for data input, verification, storage, retrieval, query, and manipulation.

Datum

A set of parameters and control points used to accurately define the three-dimensional shape of the Earth (e.g., as a spheroid). The datum is the basis for a planar coordinate

system. For example, the North American Datum for 1983 (NAD83) is the datum for map projections and coordinates within the United States and throughout North America.

Descriptive data

Tabular data describing the characteristics of geographic features. Can include numbers, text, images, and graphical information about features. ARC/INFO stores descriptive data in feature attribute tables and in related tables. Also referred to as attribute data.

Digital elevation model (DEM)

1. A digital representation of a continuous variable over a two-dimensional surface by a regular array of z values referenced to a common datum. Digital elevation models are typically used to represent terrain relief. Also referred to as 'digital terrain model' (DTM).
2. An elevation database for elevation data by map sheet from the National Mapping Division of the U.S. Geological Survey (USGS).
3. The format of the USGS digital elevation data sets.

Digital terrain model

See digital elevation model. May also be expressed as "a mathematical representation of terrain relief that can be visualized on a computer screen, or plotted on hardcopy products.

Digitize

1. To encode geographic features in digital form as X,Y coordinates.
3. The process of using a digitizer to encode the locations of geographic features by converting their map positions to a series of X,Y coordinates stored in computer files. Pushing a digitizer button records an X,Y coordinate. A digitized line is created by recording a series of X,Y coordinates.

Digitizer

1. A device that consists of a table and a cursor with crosshairs and keys used to digitize geographic features.
2. Title of the person who uses a digitizing device.

Discrete data

Geographic features containing boundaries: point, line or area boundaries.

Dissolve

The process of removing boundaries between adjacent polygons that have the same values for a specified attribute.

DLG

1. Digital Line Graph files from the U.S. Geological Survey (USGS), including data from the base map categories such as transportation, hydrography, contours, and public land survey boundaries.
2. The digital format standards published by USGS for exchanging cartographic data files and in which the USGS delivers Digital Line Graph data sets.

Double precision

Refers to a high level of coordinate accuracy based on the possible number of significant digits that can be stored for each coordinate. ARC/INFO data sets can be stored in either

single- or double-precision coordinates. Double-precision coverages store up to 15 significant digits per coordinate (typically, 13 to 14 significant digits), retaining the accuracy of much less than one meter at a global extent. See also single precision.

DTM

Digital terrain model. See digital elevation model.

DXF

Data Exchange Format. A format for storing vector data in ASCII or binary files. Used by AutoCAD and other CAD software for data interchange. DXF files are convertible to ARC/INFO coverages.

Dynamic segmentation

The process of computing the locations of events on linear features at run time based on event tables for which distance measures are available. Route-system features and event-handling commands provide the dynamic segmentation capability within ARC/INFO.

E

Easting/northing

From a State Plane Coordinate system, *easting* is equivalent to the longitude and *northing* is equivalent to the latitude of a location described in terms of distance from an origin point defined for each project or state.

Edge matching

An editing procedure to ensure that all features that cross adjacent map sheets have the same edge locations. Links are used when matching features in adjacent coverages.

Edit

To correct errors within, or modify, a computer file, a geographic data set, or a tabular file containing attribute data.

Embedded SQL

SQL statements that are embedded in a host language program.

Entity

A collection of objects (persons, places, things) described by the same attributes. Entities are identified during the conceptual design phase of database and application design.

F

Feature

A physically-identifiable entity, such as a body of water, intersection, point of elevation, voting district or city. Features are uniquely identifiable, and may include points, lines and/or polygons. See also Geographic Data Set

Feature attribute table

A table used to store attribute information for a specific coverage feature class.

Feature-ID

Synonymous term for Cover-ID and User-ID.

FGDC

The United States Federal Geographic Data Committee. Composed of representatives of several federal agencies and GIS vendors, the FGDC has the lead role in defining spatial metadata standards, which it describes in the Content Standards for Spatial Metadata (see CSSM, DGM, and SDTS).

Format

The pattern into which data are systematically arranged for use on a computer. A file format is the specific design of how information is organized in the file.

From-node

Of an arc's two endpoints, the one first digitized. See also To-node.

G

Geocode

The process of identifying the coordinates of a location given its address. For example, an address can be matched against a TIGER street network to determine the location of a home. Also referred to as address geocoding.

Geodesy

The geologic science of measuring the size and shape of the earth.

Geographic data

The locations and descriptions of geographic features. The composite of spatial data and descriptive data.

Geographic database

A collection of spatial data and related descriptive data organized for efficient storage and retrieval by many users.

Geographic data set

One of seven geographic data types supported by ARC/INFO. Geographic data sets in ARC/INFO include coverages, grids, DBMS tables, tins, images, lattices, and CAD drawings. See also Feature.

Geographic feature

A user-defined geographic phenomenon that can be modeled or represented using geographic data sets in ARC/INFO. Examples of geographic features include streets, sewer lines, manhole covers, accidents, lot lines, and parcels.

Geographic Information System

An organized collection of computer hardware, software, geographic databases, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information.

Geometry

Geometry deals with the measures and properties of points, lines and surfaces. In GIS, geometry is used to represent the spatial component of geographic features.

Georeference

To establish the relationship between page coordinates on a planar map and known real-world coordinates.

GIF

Graphics Information File (one type of graphical format, such as JPEG or TIFF).

GIS

See Geographic Information System.

Global positioning system (GPS)

A space-based radio-navigation system, consisting of twenty-four satellites and ground support that is owned and operated by the U.S. Department of Defense. The system provides users with accurate information about their position and velocity, the time, anywhere in the world as well as weather conditions. GPS was initiated in 1973.

Graphical user interface (GUI)

A method of controlling how a user interacts with a computer to perform various tasks. Instead of entering commands, the user performs desired tasks by using a mouse to choose from graphical options presented on the display screen. These are in the form of pictorial buttons (icons) and lists. Some GUI tools are dynamic and the user must manipulate a graphical object on the screen to invoke a function; for example, moving a slider bar to set a parameter value (e.g., setting the scale of a map).

Grid

A geographic data model representing information as an array of equally sized square cells arranged in rows and columns. Each grid cell is referenced by its geographic X,Y location. See also raster and grid cell.

Grid cell

A discretely uniform unit that represents a portion of the Earth, such as a square meter or square mile. Each grid cell has a value that corresponds to the feature or characteristic at that site, such as a soil type, census tract, or vegetation class. Additional values of the cell can be stored in a value attribute table (VAT).

Ground control

A known reference point, or set of points, for remote-sensing projects such as aerial photography and satellite imaging.

H – I

Heuristic

A computational method that uses trial and error methods to approximate a solution for computationally difficult problems.

Hierarchical database

A database in which records are grouped so that their relationships form a branching, treelike structure. This works best in organizing data that breaks down logically into successively greater levels of detail with limited and predictable types of access. Most graphics databases have a hierarchical structure.

Identity

The topological overlay of a coverage (input) with a polygon coverage (identity). For each feature in the input coverage, the intersection with identity features is determined, creating new features of the same feature class as the input coverage. For example, a road (input coverage, arc feature class) passing through two counties (identity coverage) would be split into two arc features, each with the attributes of the road and the county it passes through. Compare with intersect and union.

Image

A graphic representation or description of a scene, typically produced by an optical or electronic device. Common examples include remotely sensed data (e.g., satellite data), scanned data, and photographs. An image is stored as a raster data set of binary or integer values that represent the intensity of reflected light, heat, or other range of values on the electromagnetic spectrum.

Image processing

Computer techniques used to interpret and manipulate raster and digitally remote-sensed images.

Incident map

A map that displays the location of an event or events that may be used for one of two functions:

1. To fully display the geographic elements of the event.
2. To identify spatial patterns or relationships between one type of event and others of the same or related types.

Index

Special data structure used in a database to speed searching for records in tables or spatial features in geographic data sets. ARC/INFO supports both spatial and attribute indexes. See also item indexing, cross-tile indexing and spatial indexing.

Index coverage

The polygon coverage that describes, and is used as a spatial index for, the tile structure of a layer. Each polygon in an index coverage corresponds to a tile.

INFO database

The contents of a set of INFO data files, feature attribute tables, and related files stored in each ARC/INFO workspace under a subdirectory named INFO. This subdirectory contains all feature attribute tables for the set of coverages contained in the workspace.

INFORMIX

A relational database management system.

INGRES

A relational database management system to which ARC/INFO has access through the DATABASE INTEGRATOR.

Intersect

The topological integration of two spatial data sets that preserves features that fall within the area common to both input data sets. See also identity and union.

ISO

The International Organization for Standardization. A worldwide federation of national standards bodies (for example, ANSI from the U.S.) that develops international standards. A Technical Committee of this body is developing international Geographic Information Systems standards. Among many other computing documents, ISO maintains an SQL standard and is developing an extended version, SQL3, which will support advanced queries on geographic data sets.

J – K – L

JPEG

The **J**oint **P**hotographic **E**xperts **G**roup graphical standard. JPEG's work started as a compression scheme for photographic reproduction in videotext, as a precursor to the web. The main criteria was that the algorithm should be capable of real-time decoding at ISDN delivery rates using a software solution.

Jurisdictional boundaries

Linear features corresponding to the political boundaries of corporate entities such as cities, towns, townships, villages, counties or boroughs.

Landsat

A series of satellites that produce images of the earth. The Landsat remote sensing satellite program was developed by NASA (National Aeronautics and Space Administration). Landsat data are provided in formats currently supported, for integration purposes, by a number of GIS platforms. These formats include .BIL (band interleaved by line) or .BIP (band interleaved by pixel).

Latitude longitude

A spherical reference system used to measure locations on the Earth's surface. Latitude and longitude are angles measured from the Earth's center to locations on the Earth's surface. Latitude measures angles in a north-south direction. Longitude measures angles in the east-west direction.

Layer

A thematic set of spatial data described and stored in a database or a LIBRARIAN map library. Layers tend to organize a GIS by subject matter (e.g., soils, roads, and wells). Conceptually, layers in a database or map library environment are exactly like coverages.

Legend

1. The reference area on a map that lists and explains the colors, symbols, line patterns, shadings, and annotation used on the map. The legend often includes the scale, origin, orientation, and other map information.
2. The symbol used to interpret a map.

Line

1. A set of ordered coordinates that represents the shape of geographic features too narrow to be displayed as an area at the given scale (e.g., contours, street centerlines, or streams), or linear features with no area (e.g., state and county boundary lines).
2. A single arc in a coverage.
3. A line on a map (for example, a neatline).

Lookup table

1. A tabular data file containing additional attributes for features stored in an associated feature attribute table. Such a table may be an external attribute file or an internal INFO dataset that describes coverage features.
2. A special lookup table in which numeric item values are classified into categories. For example, well depth can be recorded explicitly in the feature attribute table, but also displayed and used as a set of classes, such as 0 to 250 feet, 251 to 500 feet, and so on.

M

Macro

A text file containing a sequence of commands that can be executed as one command. Macros can be built to perform frequently used, as well as complex, operations.

Map

An abstract representation of the physical features of a portion of the Earth's surface graphically displayed on a planar surface. Maps display signs, symbols, and spatial relationships among the features. They typically emphasize, generalize, and omit certain features from the display to meet design objectives (e.g., railroad features might be included in a transportation map but omitted from a highway map).

Map extent

1. The rectangular limits (corner points) of the area of the Earth's surface displayed using GIS. Map extent is specified in the coordinate system of the coverage or other geographic data set used. Typically, the extent of the geographic database (or a portion of it defined by a zoomed-in view) defines the map extent for display.
2. The geographic extent of a geographic data set specified by the minimum bounding rectangle (for example southeast and northwest corners).

Map library

An organized, uniformly defined collection of spatial data partitioned by layers and tiles into component parts called map sections. A map library organizes geographic data spatially as a set of tiles and thematically as a set of layers. The data in a map library are indexed by location for optimal spatial access. A map library organizes coverages spatially by tiles and thematically by layer.

Map limits

The rectangular area on the graphics page in which geographic features are displayed. All geographic data are drawn within the map limits, and none outside the map limits. Map titles and legends can be drawn outside the map limits.

Map projection

A mathematical model that transforms the locations of features on the Earth's surface to locations on a two-dimensional surface. Because the Earth is three-dimensional, some method must be used to depict a map in two dimensions. Some projections preserve shape; others preserve accuracy of area, distance, or direction. See also coordinate system. Map projections project the Earth's surface onto a flat plane. However, any such representation distorts some parameter of the Earth's surface be it distance, area, shape, or direction.

Map query

The process of selecting information from a GIS by asking spatial or logical questions of the geographic data. Spatial query is the process of selecting features based on location or spatial relationship (e.g., select all features within 300 feet of another; point at a set of features to select them). Logical query is the process of selecting features whose attributes meet specific logical criteria (e.g., select all polygons whose value for AREA is greater than 10,000 or select all streets whose name is 'Main St.'). Once selected, additional operations can be performed, such as drawing them, listing their attributes or summarizing attribute values.

Map scale

The reduction needed to display a representation of the Earth's surface on a map. A statement of a measure on the map and the equivalent measure on the Earth's surface, often expressed as a representative fraction of distance, such as 1:24,000 (one unit of distance on the map represents 24,000 of the same units of distance on the Earth). Map scale can also be expressed as a statement of equivalence using different units; for example, 1 inch = 1 mile or 1 inch = 2,000 feet.

Map units

The coordinate units in which a geographic data set (e.g., a coverage) is stored. Map units can be inches, centimeters, feet, meters, or decimal degrees.

Marker symbol

A symbol used to represent a point location such as an airport.

Meridian

A line running vertically from the north pole to the south pole along which all locations have the same longitude. The Prime Meridian (0) runs through Greenwich, England.

From the Prime Meridian, measures of longitude are negative to the west and positive to the east up to 180, halfway around the globe.

Metadata

Data about data. That is, textual information that provides descriptive and standards-adherence information (such as map source, projection, observation of NAD83-compliance standards, map scale, system update schedules, and so forth) for any body of GIS data exchanged between entities.

Minimum bounding rectangle

A rectangle, oriented to the x and y axes, which bounds a geographic feature or a geographic data set. It is specified by two coordinates, usually for the lower right and upper left corners.

Minimum mapping units

For a given map scale, the size or dimension below which a long narrow feature is represented as a line and a small area as a point. For example, streams and rivers will be represented as lines if their width is less than .10 inch, and polygons smaller than .125 inch on a side will be represented as a point.

Model

A representation of reality used to simulate a process, understand a situation, predict an outcome, or analyze a problem. A model is structured as a set of rules and procedures, including spatial modeling tools available in a geographic information system (GIS). See also spatial modeling, data model, analysis and spatial analysis.

Moment

The moment is the time when all the tasks associated with a transaction have completed. A feature's creation, deletion or update date is set to the transaction's moment.

Morphology

The form and structure of a surface. In tins, the morphology of a surface is defined by the sample points and breakline features used to build the triangular integrated network, or tin. Breaklines, when properly located at locations of significant change in surface behavior, play a major role in defining surface morphology. In lattices, the morphology of a surface cannot be directly represented by sample points and linear features; it must be implied from the mesh point z values.

N

NAD 27/83

In surveying, a reference system for computing or correlating the results of surveys. There are two principal types of datums: vertical and horizontal. The horizontal datum is used as a reference for position. The **North American Datum** of 1927 was defined by the latitude and longitude of an initial point, the direction of a line between this point and a specified second point, and the two dimensions that defined the resulting spheroid. NAD 1983 is based on a newly-defined spheroid; it is an Earth-centered datum having no initial point or initial direction.

Network

1. An interconnected set of arcs representing possible paths for the movement of resources from one location to another.
2. A coverage representing linear features containing arcs or a route-system. Also known as network coverage. When referring to computer hardware systems, a local area network (LAN) or a wide area network (WAN).

Network coverage

In GIS, a line coverage on which network tools operate.

Network element

The components of a network in GIS, including network links and network nodes, of which there are three types: stops, centers, and turns.

Network link

Network links are interconnected linear entities which represent the conduits for transportation (e.g., vehicles, fluids, electricity) and communication networks, for example, highways and electrical transmission lines.

Network node

Network nodes are the endpoints and connecting points of network links, for example, intersections and interchanges of a road network, the confluence of streams in a hydrologic network, or switches in a power grid. In a GIS, network nodes are used to model stops, centers, and turns in a connected set of points.

NMAS

National Map Accuracy Standards are specifications of accuracy standards for well-defined map points on published maps. These standards are specified by the U.S. Geological Survey and revised by the U.S. Bureau of the Budget.

Node

1. The beginning and ending locations of an arc. A node is topologically linked to all arcs that meet at the node. See also network node.
2. In graph theory, the location at which three or more lines connect.
3. The three corner points of each triangle in a triangular network, or tin. Every sample point input to a tin becomes a node in the triangulation. A triangle node is topologically linked to all triangles that meet at the node.

O

OGC

The Open GIS Consortium, a group composed of software vendors, academics, government agencies, consultants and software integrators, dedicated to open systems geoprocessing in a heterogeneous environment. Their first project is to develop an open geodata interoperability specification (**OGIS**).

Operating Guidelines

Those principles and standards that direct the development of Geographic Information Systems, and provide principles of action for the delivery of services and support, both automated and human.

ORACLE

A relational database management system.

Origin

1. The reference location for a planar coordinate system, usually represented by the values 0,0.
2. The place where a trip starts. This is usually the home for most consumers. For a population group, an origin could be a census tract or a city. Origins are represented as nodes in a network coverage, as points in a point coverage, and as label points in a polygon coverage.

Overlay

Information that is laid over or covers something else.

Overshoot

That portion of an arc digitized past its intersection with another arc.

P

Pan

To move the viewing window up, down, or sideways to display areas in a geographic data set which, at the current viewing scale, lie outside the viewing window. See also zoom.

Parallel

1. A property of two or more lines that is separated at all points by the same distance.
3. A horizontal line encircling the Earth at a constant latitude. The Equator is a parallel whose latitude is 0. Measures of latitude range from 0 to 90 north of the Equator and from 0 to -90 to the south.

Parcel

A portion of the earth defined by a boundary. In a GIS, usually a plot of land defined by ownership.

PAT

Point Attribute Table, or **Polygon Attribute Table**. A coverage can have either a point attribute table or a polygon attribute table, but not both. In addition to user-defined attributes, a PAT contains data on area and perimeter of a polygon (values are 0 for points), an internal sequence number and feature identifier. The PAT is also used for regions. The same attributes are maintained as for polygons. One polygon and many region attribute tables can be stored in the same coverage. See feature attribute table.

Path

An ordered set of network links and network nodes, which connects an origin to a destination (center).

Pathfinding

The process of finding a path between an origin and destination, which usually involves determining a “least-cost” path.

Pathname

The path to a file or directory located on a disk. Pathnames are always specific to the computer operating system.

Photogrammetry

1. The process of making maps or scale drawings from photographs, especially aerial photographs.
2. The process of making precise measurements by means of photography.

Pixel

A contraction of the words picture element. The smallest unit of information in an image or raster map. Referred to as a cell in an image or grid.

Planimetric map

A map displaying features on a two-dimensional plane, with no reference to contours or matters of topographic relief.

Point

1. A single X,Y coordinate that represents a geographic feature too small to be displayed as a line or area; for example, the location of a mountain peak or a building location on a small-scale map.
2. A coverage feature class used to represent point features or to identify polygons. It is not possible to have point and polygon features in the same coverage. When representing point features, the X,Y location of the label point describes the location of the feature. When identifying polygons, the label point can be located anywhere within the polygon. Attributes for points are stored in a polygon attribute table.

Polygon

A coverage feature class used to represent areas. A polygon is defined by the arcs that make up its boundary and a point inside its boundary for identification. Polygons have attributes that describe the geographic feature they represent.

Polygon-arc topology

The topological data structure ARC/INFO uses to represent connectivity between arcs to form polygons. Polygon-arc topology supports the definition of polygons and analysis functions such as topological overlay. See also topology.

Polygon overlay

A topological overlay procedure which determines the spatial coincidence of two sets of polygon features and creates a new set of polygons based on identity, intersect, or union.

Precision

Refers to the degree of exactness with which a quantity is stated. This fact is usually identified by the number of significant digits used to store numbers, and in particular, coordinate values. Precision is important for accurate feature representation, analysis and mapping

Policy

A rule, standard, or statement that defines or governs either: (a) The definition of a specific element within a GIS, (b) The collection and maintenance of information resident in a corporate information system, (c) “Rules of Behavior” with regard to the maintenance, use and distribution of geographic information, and/or (d) Provision of such information to other governmental agencies, corporate bodies, or citizens.

Principles

Those practices, objectives, standards or codes of service that govern the development, management and utilization of geographic information.

Procedure

In technological enterprises, a series of instructions to be followed by which an end is accomplished. Typically, the term procedures is utilized to refer to computer applications or developments. In addition, a procedure is often defined as a subtask of a process, or as something done by an individual rather than a group or team.

Process

The rules of service provision – i.e., a workflow – that govern the means or actions required to complete a specific task, such as requesting a map. Processes may be made up of one-to-many procedural networks.

Program

Relative to the concerns of GIS:

1. A system of projects or services intended to meet a public need.
2. A series of steps to be carried out or goals to be accomplished.
3. A sequence of instructions that a computer can interpret and execute.
4. A group of projects focused towards a long-term goal.

Project

A set of work tasks that have a defined beg and end date.

Projection

1. A mathematical model for representing the shape of the earth on a flat plane.
2. A formula that converts latitude-longitude locations on the earth’s spherical surface to X,Y locations on a map’s flat surface.

Q – R

Quadrangle (quad)

See topographic map.

Query

See map query.

Raster

A cellular data structure composed of rows and columns for storing images. Groups of cells with the same value represent features. See also grid.

RDBMS

Relational Database Management System, or RDBMS. A database management system with the ability to access data organized in tabular files that can be related to each other by a common field (item). An RDBMS has the capability to recombine the data items from different files, providing powerful tools for data usage. See also relate.

Record

1. In an attribute table, a single `row' of thematic descriptors. In SQL terms, a record is analogous to a tuple (a data object containing two or more components).
2. A logical unit of data in a file. For example, there is one record in a database for each arc in a coverage.

Rectification

The process by which an image or grid is converted from image coordinates to real-world coordinates. Rectification typically involves rotation and scaling of grid cells, and thus requires resampling of values.

Referential integrity

The capability to ensure that changes to one table that affect other tables are transmitted to those other tables. For example, a table will not be given a foreign key value that does not exist as a primary key in another table.

Region

A coverage feature class used to represent a spatial feature as one or more polygons. Many regions can be defined in a single coverage. Regions have attributes that describe the geographic feature they represent.

Relate

An operation that establishes a temporary connection between corresponding records in two tables using an item common to both (i.e., relate key). Each record in one table is connected to those records in the other table that share the same value for the common item. Compare with relational join.

Relate key

The common set of columns used to relate two attribute tables. See also relate, primary key and foreign key.

Relation

A logical or natural association between two or more things; relevance of one to another; connection. See table.

Relational database

A method of structuring data as collections of tables that are logically associated to each other by shared attributes. Any data element can be found in a relation by knowing the

name of the table, the attribute (column) name, and the value of the primary key. See also relate, relate key, and relational join.

Relational join

The operation of relating and physically merging two attribute tables using their common item.

Remote sensing

Acquiring information about an object without contacting it physically. Methods include aerial photography, radar, and satellite imaging.

Resampling

The process of reducing image data set size by representing a group of pixels with a single pixel. Thus, pixel count is lowered, individual pixel size is increased, and overall image geographic extent is retained. Resampled images are "coarse" and have less information than the images from which they are taken. Conversely, this process can also be executed in the reverse.

Resolution

1. Resolution is the accuracy at which a given map scale can depict the location and shape of geographic features. The larger the map scale, the higher the possible resolution. As map scale decreases, resolution diminishes and feature boundaries must be smoothed, simplified, or not shown at all. For example, small areas may have to be represented as points.
2. Distance between sample points in a lattice.
3. Size of the smallest feature that can be represented in a surface.
3. The number of points in x and y in a grid or lattice (e.g., the resolution of a U.S. Geological Survey one-degree DEM is 1201 x 1201 mesh points).

Restore

To return a database to a previous state by undoing all changes made since the given time.

Route

A feature class in a GIS that is part of the route-system data model used to represent linear features. Routes are based on an arc coverage and are defined as an ordered set of sections. Because sections represent the portion of an arc used in a route, routes do not have to begin or end at nodes. The route attribute table stores route attributes. See also route-system and route measure.

Route attribute table (RAT)

Route attribute table. An RAT stores route attributes. There is one RAT for each route-system in a coverage. In addition to user-defined attributes, an RAT contains a sequence number and feature identifier for each route. See also route-system, section, and feature attribute table.

Route measure

A location along a route, defined as a measure from a start point, where measures include distance, time, milepost, address range. Measures are useful for locating events along a route. There may be more than one start or end within a route, in which case, the

measures may not be unique within a route-system. For example, there are many places that are within a one-minute response time from a fire station.

Route-system

A collection of routes representing separate instances of a common linear entity, for example, all school bus routes in a city. A single line coverage can contain many route-systems, differentiated by name. For example, a road coverage can contain a bus route-system, a highway route-system and a pizza delivery route-system. See also event.

Row

1. A record in an attribute table. The horizontal dimension of a table composed of a set of columns containing one data item each.
2. A horizontal group of cells in a grid, or pixels in an image.

Rubber sheeting

A procedure to adjust coverage features in a nonuniform manner. Links representing from- and to-locations are used to define the adjustment.

S

Satellite image

A picture of the earth taken from an earth-orbital satellite. Satellite images may be produced photographically or by on-board scanners.

Scale

See map scale.

Scale bar

A map element that shows the map scale graphically.

Scanning

The process of capturing data in raster format with a device called a scanner. Some scanners also use software to convert raster data to vector data.

SDTS/TVP

Spatial Data Transfer Standard/Topological Vector Profile. A United States Federal standard designed to support the transfer of different types of geographic and cartographic spatial data between entities. This standard specifies a structure and content for spatially referenced data in order to facilitate data transfer between dissimilar spatial database systems. The Topological Vector Profile addresses a wide variety of vector data types, models, and structures, as well as associated attribute data. This includes metadata that addresses internal spatial reference, completeness, positional and attribute accuracy, logical consistency, and data dictionaries available. Also known as Federal Information Processing Standard (FIPS) 173.

Shade symbol

A pattern used to shade polygons in a GIS. Shade symbol patterns include crosshatch, repeating, and solid fill.

SIF

Standard Interchange Format, a spatial data exchange format. A standard or neutral format used to move graphics files between computer systems.

Single precision

Refers to a level of coordinate accuracy based on the number of significant digits that can be stored for each coordinate. Single-precision numbers store up to 7 significant digits for each coordinate, retaining a precision of 5 meters in an extent of 1,000,000 meters. Typically, GIS data sets can be stored as either single- or double-precision coordinates. See also double precision.

Sliver polygon

A small areal feature commonly occurring along the borders of polygons following the topological overlay of two or more coverages (that is, those areas that occur when bounding polygons do not actually meet, or where their common boundaries diverge from one another).

Slope

A measure of change in surface value over distance, expressed in degrees or as a percentage. For example, a rise of 2 meters over a distance of 100 meters describes a 2% slope with an angle of 1.15. Mathematically, slope is referred to as the first derivative of the surface.

Spatial analysis

The process of modeling, examining, and interpreting model results. Spatial analysis is useful for evaluating suitability and capability, for estimating and predicting, and for interpreting and understanding. There are four traditional types of spatial analysis: topological overlay and contiguity analysis, surface analysis, linear analysis, and raster analysis.

Spatial data

Information about the location and shape of, and relationships among, geographic features, usually stored as coordinates and topology.

Spatial feature

See geographic feature.

Spatial indexing

A means of accelerating coverage drawing, spatial selection, and feature identification by generating feature-based indexes for one or more feature classes of a coverage.

Spatial interaction

An analytical technique that estimates the number of interactions occurring between an origin and destination locations. The number of interactions is based on the properties of the origin to produce a trip (production), the destination's attractiveness and the impedance of the link between the two locations. The goal of spatial interaction modeling is to be able to model and predict the number of interactions occurring between populations for a particular type of activity such as retailing.

Spatial modeling

Analytical procedures applied with a GIS. There are three categories of spatial modeling functions that can be applied to geographic features within a GIS: (1) Geometric models, such as calculating the Euclidean distance between features, generating buffers, calculating areas and perimeters, and so on; (2) Coincidence models, such as topological overlay; and (3) Adjacency models (pathfinding, redistricting, and allocation). All three model categories support operations on spatial data such as points, lines, polygons, tins, and grids. Functions are organized in a sequence of steps to derive the desired information for analysis. See also model and analysis.

Spatial order

An index assigned to features based on their relative closeness in two-dimensional space.

Spatial query

See map query.

SQL

Structured Query Language. A syntax for defining and manipulating data from a relational database. Developed in the 1970s, it has become an industry standard for query languages in most relational database management systems.

State plane coordinate system

System of X,Y coordinates defined by the U.S. Geological Survey for each state. Locations are based on the distance from an origin point defined for each state.

Subclass

A special feature class in a coverage which allows many features of the same class to be defined. Annotation, region, route-system, and section are types of subclasses. For example, a road coverage may have three route-systems stored as subclasses for mail delivery, street cleaning, and garbage pickup.

Subject Data

That information, or data, which is the target of (1) The GIS customer or support staff member, or (2) That project objective applied to a GIS.

Surface

A geographic phenomenon represented as a set of continuous data, such as elevation or air temperature over an area. A clear or sharp break in values of the phenomenon (breaklines) indicates a significant change in the structure of the phenomenon (e.g., a cliff), not a change in geographic feature. Surfaces can be represented by models built from regularly or irregularly spaced sample points on the surface. See also surface model.

Surface model

Digital abstraction or approximation of a surface. Because a surface contains an infinite number of points, some subset of points must be used to represent the surface. Each model contains a formalized data structure, rules, and X,Y,Z point measurements that can be used to represent a surface.

Survey control network

1 A graphically defined lattice of precise control points – known as monuments – and traverse alignments reconciled to those monuments. This lattice serves as a

- framework for referencing the position of all map features in a spatial database, thereby assuring accuracy standards.
- 2 Points with a given horizontal position and surface elevation.
 - 3 Precise information used to determine unknown horizontal positions and elevations of locations elsewhere in the active portion of a spatial database.

SYBASE

A relational database management system.

Symbol

A graphic pattern used to represent a feature. For example, line symbols represent arc features; marker symbols, points; shades symbols, polygons; and text symbols, annotation. Many characteristics define symbols, including color, size, angle, and pattern. See also text symbol, marker symbol, shade symbol, and line symbol.

Symbol environment

Defines the types of map symbols and their characteristics during a graphic display session. There are four types of active map symbols: line, marker, shade, and text.

System tables

Tables which contain information about a database, such as the data dictionary and database transactions.

T

Table

A set of data elements that has a horizontal dimension (rows) and a vertical dimension (columns) in a relational database system. A table has a specified number of columns but can have any number of rows. A table is often called a relation. Rows stored in a table are structurally equivalent to records from flat files in that they must not contain repeating fields.

Template

1. A coverage containing common feature boundaries, such as land-water boundaries, for use as a starting place in automating other coverages. Templates save time and increase the precision of topological overlays.
2. A map template containing neatlines, North arrow, logos, and other cartographic map elements for a common map series.
3. An empty tabular data file containing only item definitions.

Thematic map

A map that portrays the distribution of features, incidents, or classifications related to a specific topic.

Thiessen polygons

Polygons whose boundaries define the area that is closest to each point relative to all other points. Thiessen polygons are generated from a set of points. They are mathematically defined by the perpendicular bisectors of the lines between all points. A tin structure is used to create Thiessen polygons.

Theme

A user-defined perspective on a coverage, grid, tin or image geographic data set specified, if applicable, by a coverage name and feature class or data set name, attributes of interest, a data classification scheme, and theme-specific symbology for drawing.

Thematic data

See descriptive data.

Tic

Registration or geographic control points for a coverage representing known locations on the Earth's surface. Tics allow all coverage features to be recorded in a common coordinate system (e.g., Universal Transverse Mercator [UTM] meters or State Plane feet). Tics are used to register map sheets when they are mounted on a digitizer and to transform the coordinates of a coverage (e.g., from digitizer units [inches] to UTM meters).

TIC file

The coverage file used to store tic coordinates and tic IDs for a coverage.

Tic match tolerance

The maximum distance allowed between an existing tic and a tic being digitized. If this distance is exceeded, the digitizing error is considered unacceptable and the map must be registered over again. The tic match tolerance is used to ensure a low "scale" error during map registration on a digitizer.

TIFF

Tagged Interchange (image) File Format. An industry-standard raster data format. TIFF supports black-and-white, gray-scale, pseudocolor, and true-color images, all of which can be stored in a compressed or uncompressed format. TIFF is commonly used in desktop publishing and serves as an interface to numerous scanners and graphic arts packages.

TIGER

The **Topologically Integrated Geographic Encoding and Referencing** data format used by the U.S. Census Bureau to support census programs and surveys. It was used for the 1990 census. TIGER files contain street address ranges along lines and census tract/block boundaries. This descriptive data can be used to associate address information and census/demographic data with coverage features.

Tile

The spatial unit by which geographic data is organized, subdivided, and stored in a map library. Tiles subdivide the area covered by a map library and organize the library data by location (e.g., counties might be the tiles in a statewide database). A tile can be a regular, geometric shape (e.g., a map sheet), or an irregular shape, such as a county boundary.

TIN

Triangulated Irregular Network. A surface representation derived from irregularly spaced sample points and breakline features. The TIN data set includes topological relationships between points and their neighboring triangles. Each sample point has an X,Y coordinate

and a surface, or z-value. These points are connected by edges to form a set of non-overlapping triangles used to represent the surface. TINs are also called irregular triangular mesh or irregular triangular surface models.

To-node

Of an arc's two endpoints, the one last digitized. See also from-node.

Topographic map

1. A map containing contours indicating lines of equal surface elevation (relief), often referred to as topo maps.
2. Often used to refer to a map sheet published by the U.S. Geological Survey in the 7.5-minute quadrangle series or the 15-minute quadrangle series.

Topological overlay

An analysis procedure for determining the spatial coincidence of geographic features. GIS supports overlay among and between all feature classes. See also identity, intersect and union.

Topology

The spatial relationships between connecting or adjacent coverage features (e.g., arcs, nodes, polygons, and points). For example, the topology of an arc includes its from- and to-nodes, and its left and right polygons. Topological relationships are built from simple elements into complex combinations: points (simplest elements), arcs (sets of connected points), areas (sets of connected arcs), and routes (sets of sections, which are arcs or portions of arcs). Redundant data (coordinates) are eliminated because an arc may represent a linear feature, part of the boundary of an area feature, or both. Topology is useful in GIS because many spatial modeling operations don't require coordinates, only topological information. For example, to find an optimal path between two points requires a list of the arcs that connect to each other and the cost to traverse each arc in each direction. Coordinates are only needed for drawing the path after it is calculated.

Transformation

The process that converts coordinates from one coordinate system to another through translation, rotation, and scaling. Most GIS packages support these transformations: similarity, affine, piecewise linear, projective, NADCON datum adjustment using minimum-derived curvature transformation, and a polynomial transformation to warp grids and images.

U

Undershoot

An arc that does not extend far enough to intersect another arc.

Union

A topological overlay of two polygonal spatial data sets which preserves features that fall within the spatial extent of either input data set; that is, all features from both coverages are retained. See also intersect and identity.

Universe polygon

The first record in a polygon attribute table. It represents the area beyond the outer boundary of the coverage. It's the only polygon that never has a label point, and so has a User-ID value of 0. Its area equals the negative sum of all the polygons in the coverage. Also referred to as the external polygon.

USGS DEM

United States Geological Survey Digital Elevation Model. A digital product produced by the Survey Branch of the United States Department of the Interior, consisting of a regular array of elevations referenced in the Universal Transverse Mercator (UTM) coordinate system. These data correspond to the standard 1:24,000-scale 7.5 x 7.5-minute quadrangles or 1:250,000 one-degree map sheets. Elevations are in meters or feet referenced to mean sea level.

USNMAS

U.S. National Map Accuracy Standards: Accuracy standards for published maps in English units defining measurements for horizontal and vertical accuracy. It is described in absolute terms; however, it is not described in statistical terms and some inconsistencies have been noted, thereby making it unusable for engineering mapping (large-scale mapping), and it is not convenient to use in conjunction with mapping from space (remote sensing).

V

Value attribute table (VAT)

A table containing attributes for a grid. In addition to user-defined attributes, the VAT contains the values assigned to cells in the grid and a count of the cells with those values.

Vector

A coordinate-based data structure commonly used to represent linear geographic features. Each linear feature is represented as an ordered list of vertices. Traditional vector data structures include double-digitized polygons and arc-node models. Vectors have both amount and direction.

Vertex

One of a set of ordered X,Y coordinates that constitutes a line.

Virtual table

See view.

View

A logical table whose data are not physically stored. You define a view to access a subset of the columns stored in a row, access a set of columns stored in different rows, or avoid creating a redundant copy of data that is already stored.

W – X – Y – Z

X-axis

The first, or horizontal, axis of a three-dimensional Cartesian coordinate system that crosses the Y-axis plane at a 90-degree angle. The X-axis is normally used to represent east-west direction.

Y-axis

The second, or vertical, axis of a three-dimensional Cartesian coordinate system that crosses the X-axis plane at a 90-degree angle. The Y-axis is normally used to represent north-south direction.

Z-axis

The third, or height, axis of a three-dimensional Cartesian coordinate system that crosses the X,Y axis plane at a 90-degree angle. The Z-axis is normally used to represent elevation above sea level.

Zoom

To enlarge and display greater detail of a portion of a geographic data set.