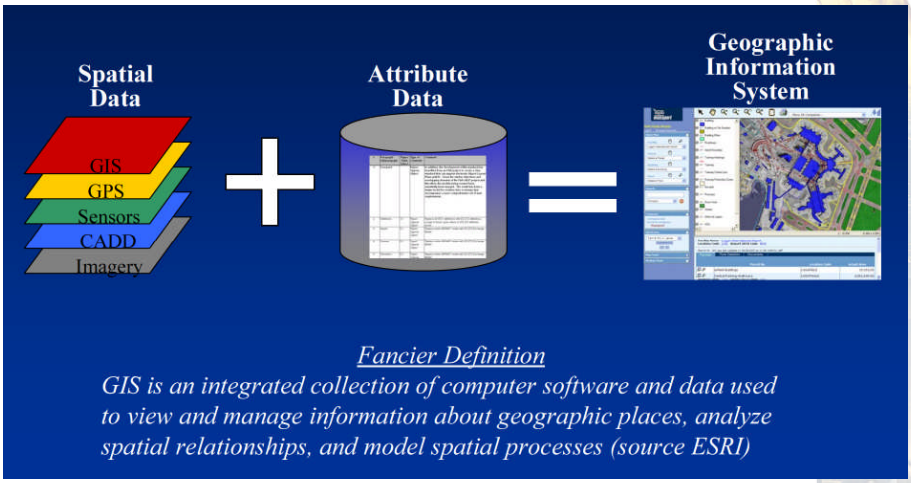
GIS 101 | Agenda

- General GIS (10 min)
- FAA GIS Schema Framework (10 min)

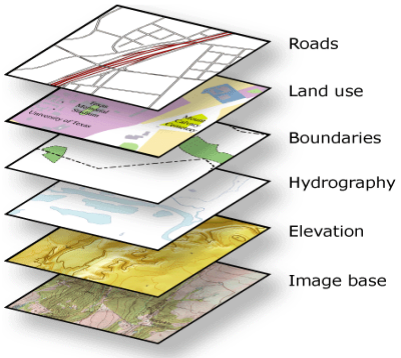
What is a Geographic Information System?



Fancier Definition

GIS is an integrated collection of computer software and data used to view and manage information about geographic places, analyze spatial relationships, and model spatial processes (source ESRI)

FAA is helping develop a GIS system for Airports



- A GIS layout includes a list of layers, a map, and tools used to interact with the map and underlying data
- A GIS is typically created through programming software (the most widely used is ESRI's ArcGIS)
- Airports GIS is being developed independent of a software program and utilizes an Internet-based web application

Common GIS Terms and Definitions

- **Layer |** a slice or stratum of data considered equivalent to a legend item on a map (eg., on a city map, the layers could include: streets, bodies of water, property/land parcels, parks, etc.)
- **Feature |** an individual **point, line, or polygon** that has both geometry and spatial information (eg., Runway, Taxiway, etc.)
- **Feature Class |** a group of features (eg., a points feature class or a polygon feature class) contained in a data file
  - a ***RUNWAY*** is a *feature* in the **Airfield *Class***
  - a ***BUILDING*** is a *feature* of the **Manmade Structures *Class***
- **Attribute |** information about a geographic feature, typically stored in a table called an attribute table
  - Typically, each row represents a feature on the map;
  - and each column is an attribute of the feature

Common GIS Terms and Definitions (continued)

- **Metadata |** information about the content, quality, condition, and other characteristics of data (i.e. "data about the data")
  - how, when, where, by whom data was collected
  - accuracy and reliability
  - scale and resolution
  - geographic projection or coordinate system

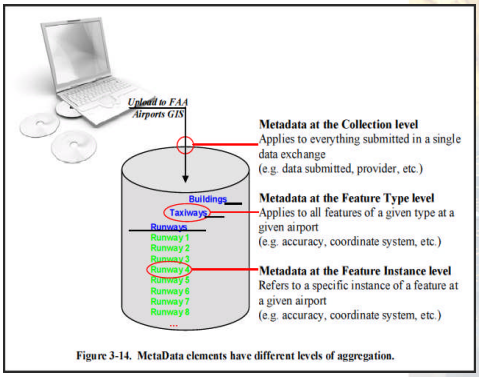


Figure 3-14. MetaData elements have different levels of aggregation.

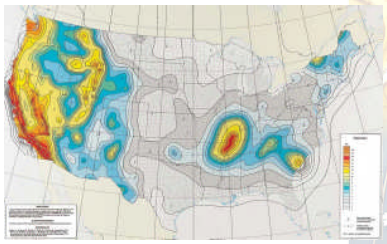
- **AC150/5300-18** uses metadata elements defined by International Standards Organization's (ISO) Geographic Information–Metadata Standard (ISO 19115)
- Of the 409 elements defined in ISO 19115, only 29 are used in -18

Why use GIS? Data VISUALIZATION!

	A	B	C
1	January	Product 1	Product 2
2	North	12.6	13.2
3	South	9	14.5
4	East	12.2	16.8

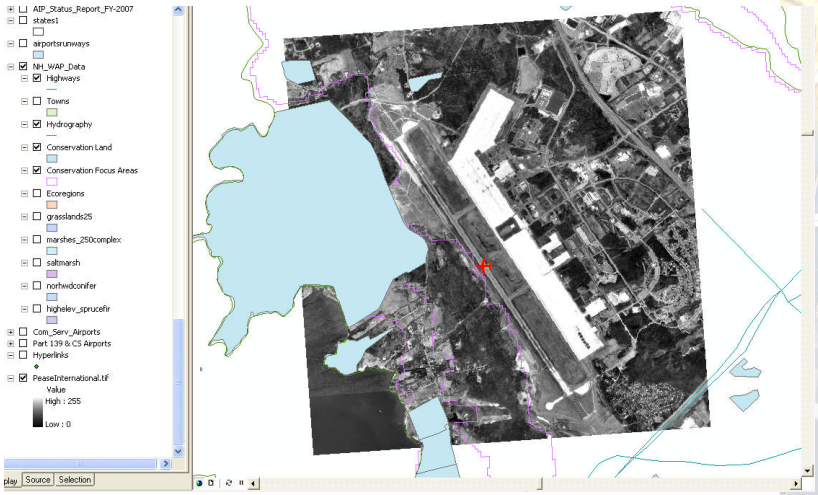
	A	B	C	D
1	February	Product 1	Product 2	Produ
2	North	12.3	12.8	
3	South			
4	East			

	A	B	C	D
1	March	Product 1	Product 2	Produ
2	North	12.6	13.2	
3	South	9	14.5	
4	East	12.2	16.8	

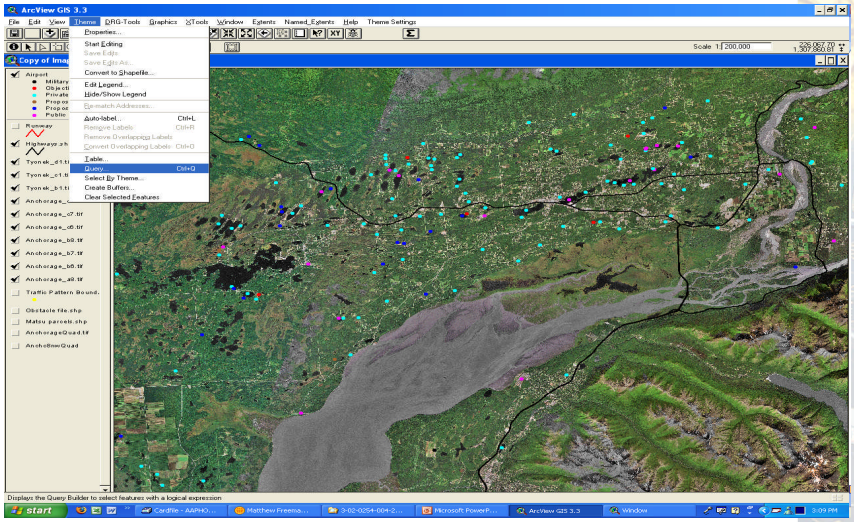


- When trying to visualize and understand relationships between data, it is much better to have a picture in front of you rather than just tables of numbers
- This concept is extremely valuable for communicating and sharing data with others

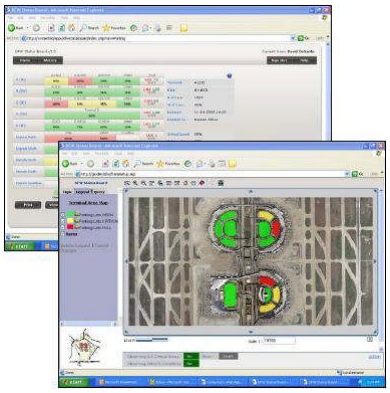
Why use GIS? Data INTEGRATION!



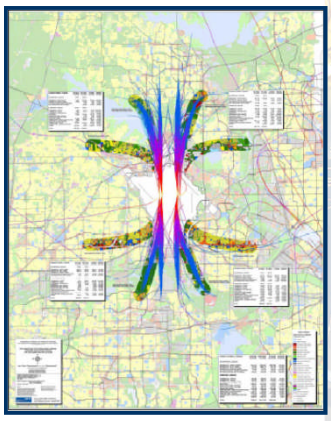
Why use GIS? Data ANALYSIS!



Using GIS at Airports (DFW examples)



DFW: LIVE Parking Status



DFW: Flight Track Analysis

What is the difference between CAD and GIS?

CAD

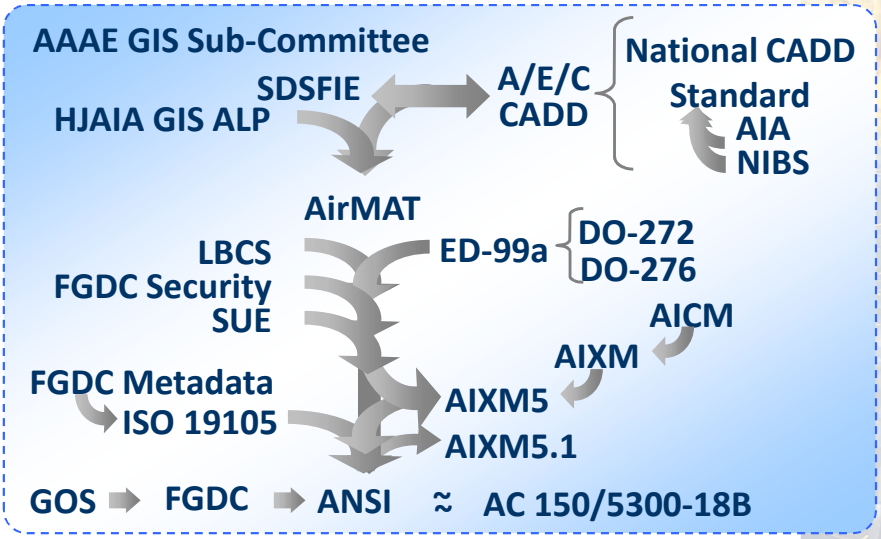
- used to represent objects or features found on the Earth, typically using coordinate systems that are relative to the features being represented
- a drafting tool, ideally suited for creating precise technical drawings, such as a detailed future airport layout plan or an architectural drawing of a house or engineering project plans

GIS

- used to represent parts of the Earth itself, using coordinate systems that are relative to particular locations on the Earth
- A DATA MANAGEMENT TOOL great for bringing together and relating geographic data features and their attributes
- Its real power comes in its ability to bring together many different types of data from many different sources, relate that data in a spatial context, and use the data relationships to develop conclusions, answer questions, and solve problems

Distinction between the two blurs as technology progresses; the root is the key difference

The Evolution of 18B (and related standards)



Airports GIS Features

- Points
- Lines
- Polygons

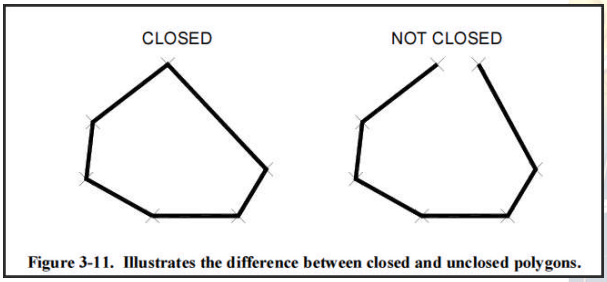


Figure 3-11. Illustrates the difference between closed and unclosed polygons.

- Complex Geometry Types, such as arcs, circles, donuts, and ellipses, are not included in the -18B standard

Airports GIS Features (continued)

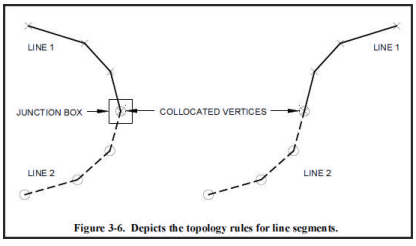
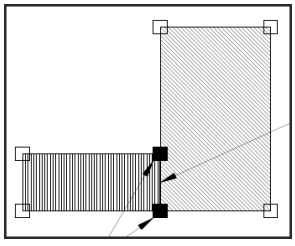
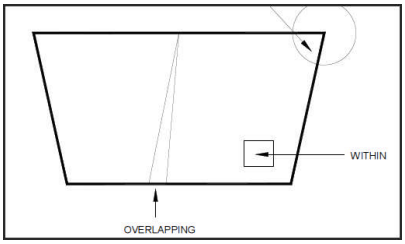


Figure 3-6. Depicts the topology rules for line segments.





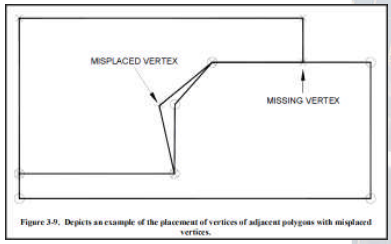


Figure 3-9. Depicts an example of the placement of vertices of adjacent polygons with misplaced vertices.

-18, Chapter 5 | Feature Groups

- Airfield
- Airspace
- Cadastral
- Environmental
- Geospatial
- Man Made
- Navigational Aides
- Seaplane
- Security
- Surface Transportation
- Utilities

5.3.1. Paragraph Number and FeatureClassName

Definition: *Definition of feature.*				
Feature Group	*The Feature Group of the element.*			
Feature Class Name	*The proper name of the Feature Class.*			
Feature Type	*The compliant geometry of element.*			
CADD Standard Requirements				
Layer/Level	**Description**			
Compliant layer name.	*Compliant layer description. [Siting]*			
	Color	**Line type**	**Line Weight**	**Symbol**
AutoDesk Standards	*Color code AutoCAD*	*Line type required*	*Line weight AutoCAD*	*Symbol type is user defined*
MicroStation Standards	*Color code MicroStation*		*Line weight MicroStation*	
Information Assurance Level	*Security level credential*			
Equivalent Standards	**AIXM**	*AIXM equivalent of feature.*		
	FGDC	*FGDC equivalent of feature.*		
	SDSFIE	*SDSFIE equivalent of feature.*		
Documentation and Submission Requirements	The required documentation for feature class elements. Minimum requirements are defined in paragraphs 1.5.2 and 1.5.3. Additional or expanded documentation requirements are located here.			
Related Features				
Data Capture Rules: *Description of proper collection limits and requirements for feature class element.*				
Monumentation	*Monumentation requirements.*			
Survey Point Location	**Horizontal**		**Vertical**	
	Description of specific HSP location.		*Description of specific VSP location.*	

Accuracy Requirements (in feet)	**Horizontal**	**Vertical**	
		Orthometric	**Ellipsoidal**
	Accuracy requirement	*Accuracy requirement*	*Accuracy requirement*
Resolution	**Geographic Coordinates**	**Distances and Elevations**	
	Coordinate resolution requirement	*Coordinate resolution requirement*	
Feature Attributes			
Attribute (Datatype)	**Description**		
Name of attribute field	*Description of attribute specifications*		

Attribute Enumerations (Domain Values)

- **Sometimes it is necessary to limit the range of values for an attribute. -18 uses the domain for an attribute to list the acceptable values**
  - **Range domains** limit the attribute values to a range of numeric or date values
  - **List domains** limit values to a selection of choices
- **A code list allows users to add values to a list of acceptable values and still be compliant with the standard. An enumeration is a list users cannot add to. In this standard, most of the list domains are enumerations.**
- **For each such attribute with enumeration, there is an associated table in Chapter 5 listing the acceptable values and their definitions**

5.15. ATTRIBUTE ENUMERATIONS

The following tables contain the expected values in fields that are of type enumeration.

5.15.1. CodeAcqusitionType

Value	Description
FEE_SIMPLE	Purchased real property; absolute ownership
EASEMENT	Rights given to use land in a specific manner
LEASED	Restricted use of land for a specific period of time

5.15.2. CodeAirportFacilityType

Value	Description
AD	Airport only
AH	Airport with helicopter landing area
H	Helicopter (the stall speed method of calculating aircraft category does not apply)
HP	Heliport only
LS	Landing Site

Special Acknowledgement

- ✓ Thanks to Amanda Wingerter (ANE), Matt Freeman (AAL), Randy Murphy (Grafton), and Dave DeSanto (DFW) for developing and providing input into this GIS 101 material

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