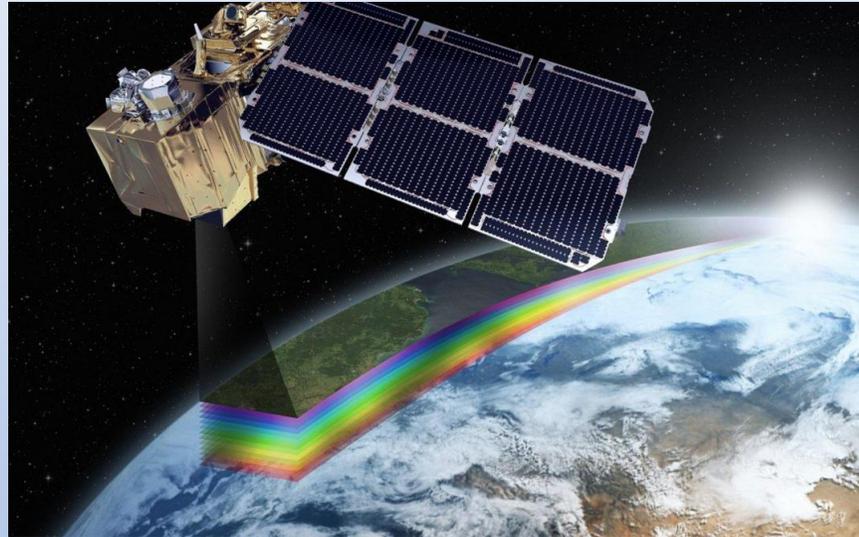
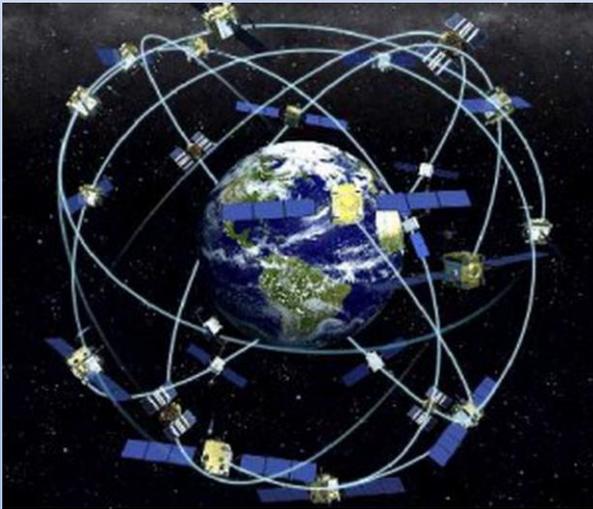
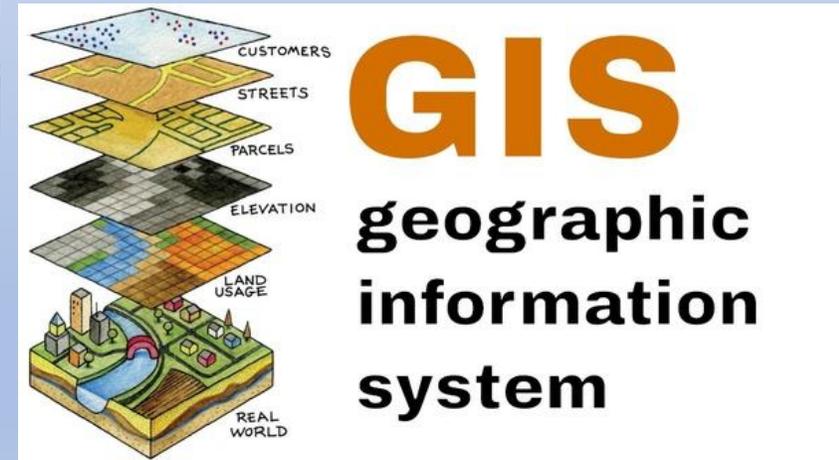


Intro to GPS, Remote Sensing and GIS



Sara Mierzwiak
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GLOBE Mission EARTH
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 Research Assistant
 GLOBE Mission EARTH
 University of Toledo



Hydrogeologist



Keyser Elementary
 Ottawa River Elementary
 Leverette Junior High School
 Woodward High School



BS Geology
 MS Geology
 MA Geography
 GIS Certificate



Boy, Whiskey and Fritzie

What is GPS?

Global
Positioning
System



The GPS constellation

What is the Global Positioning System?

- A worldwide, satellite-based radio navigation system
- Consists of 24 operational satellites
- Provides specially-coded satellite signals that can be processed in a GPS receiver, enabling the receiver to compute position, velocity and time
- Four GPS satellite signals are used to compute positions in three dimensions

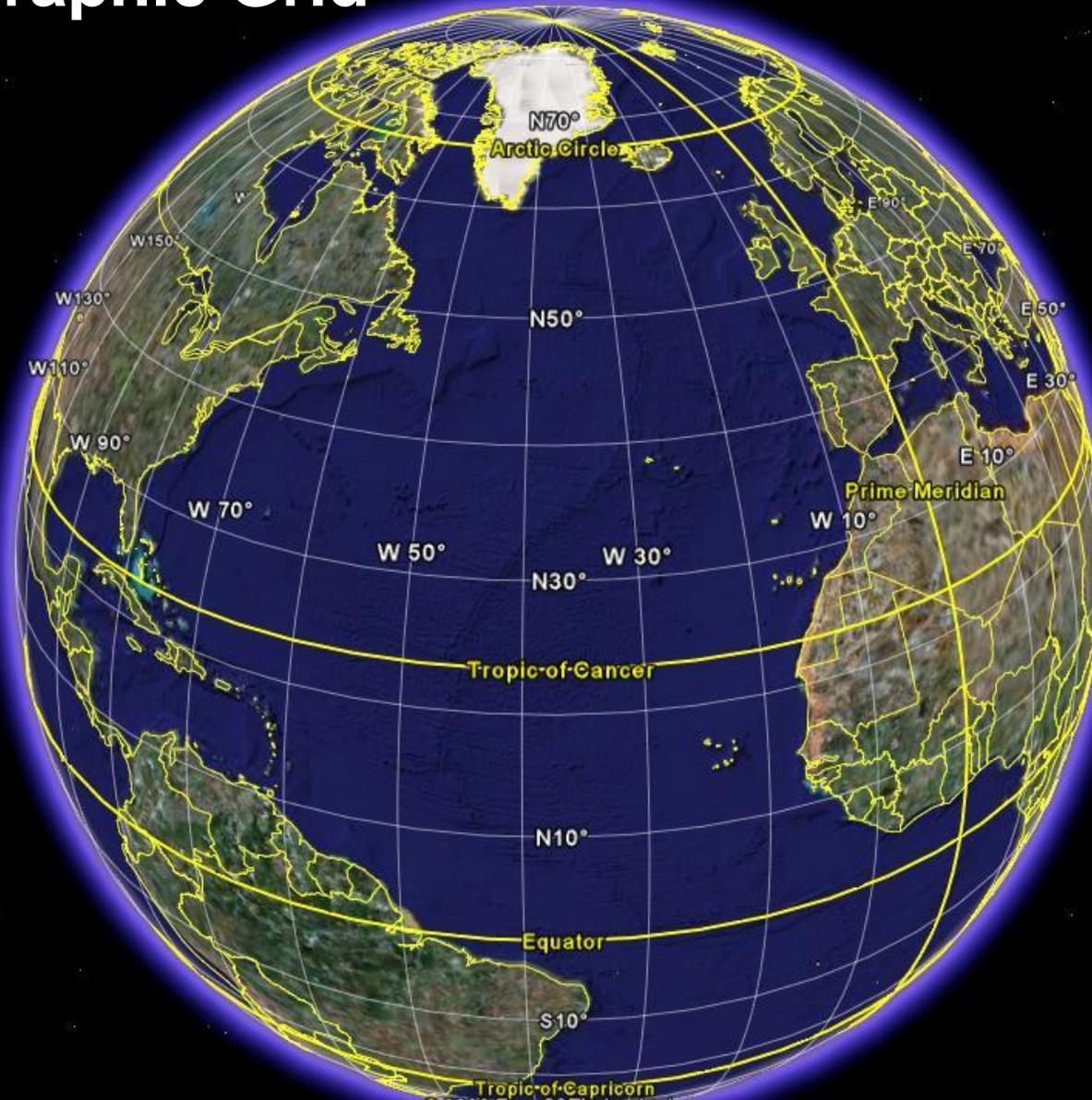


Satellites

- Each GPS satellite orbits the Earth twice a day
- Each satellite transmits signals to Earth
- GPS receivers measure the time between when satellites sent a signal relative to the GPS receiver receiving the signal
 - Tells how far away the satellite is
- Signals from several satellites will give accurate results



The Geographic Grid



© 2006 Europa Technologies
Image © 2006 NASA
Image © 2006 TerraMetrics

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W81.881° W81.879° W81.877° W81.875° W81.873° W81.871° W81.869° W81.867° W81.865° W81.863° W81.861° W81.859°



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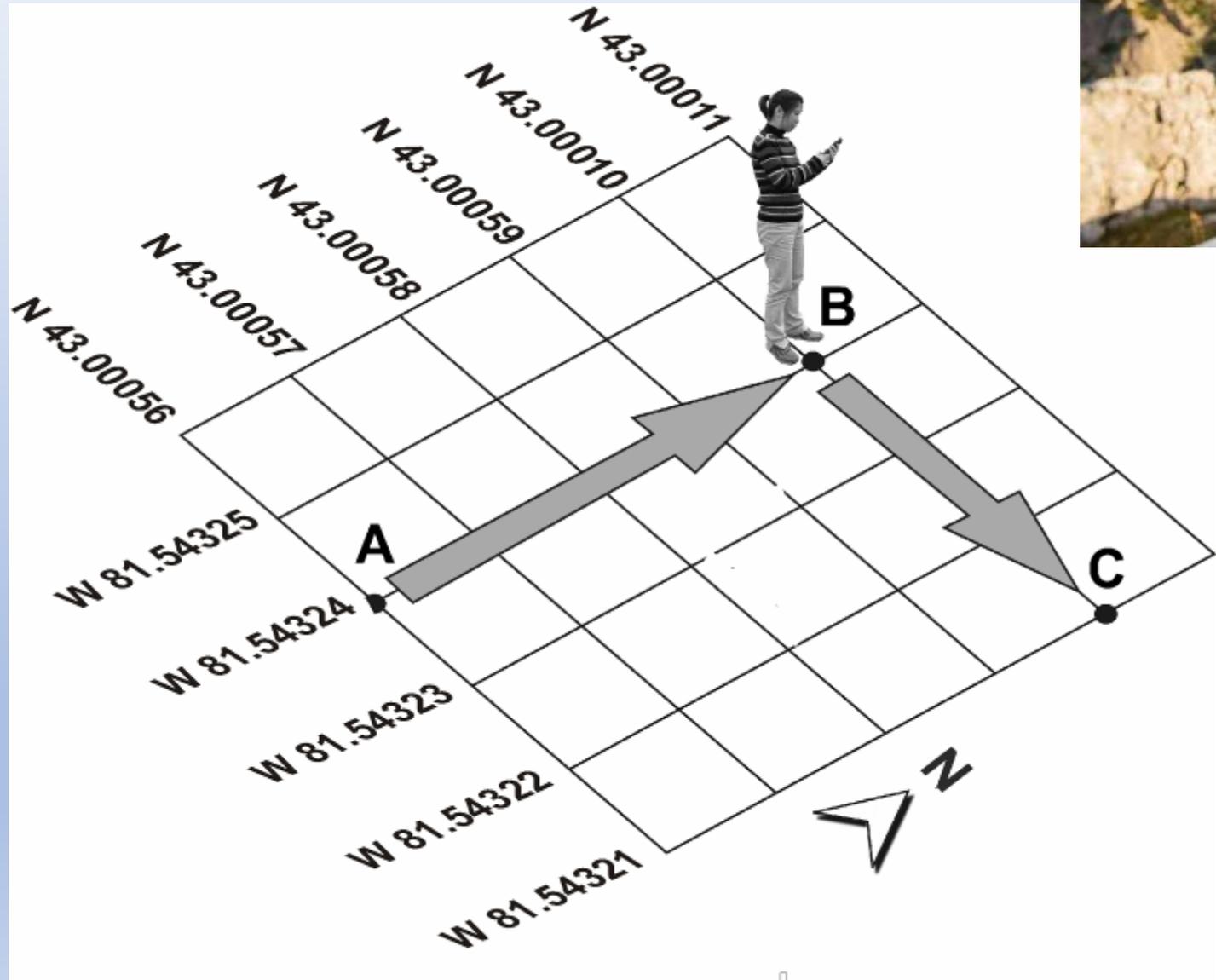
© 2006 Google

Pointer lat 41.409563° lon -81.869583° elev 673 ft

Streaming [|||||] 100%

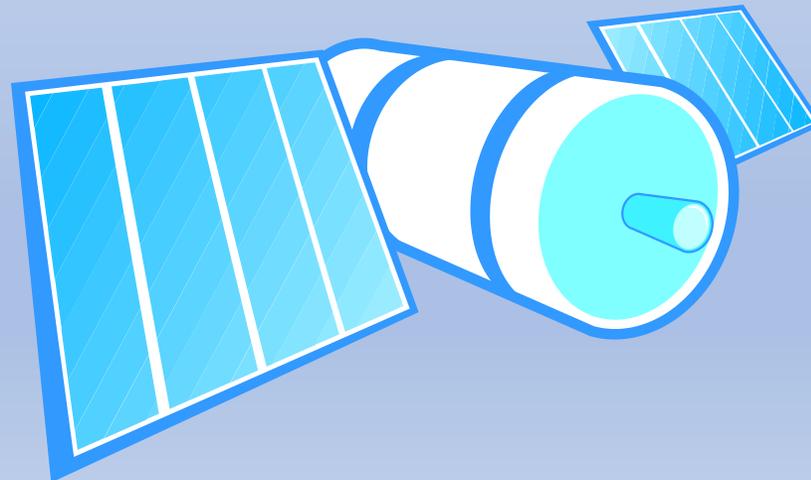
Eye alt 6084 ft

Moving over the grid



What is remote sensing?

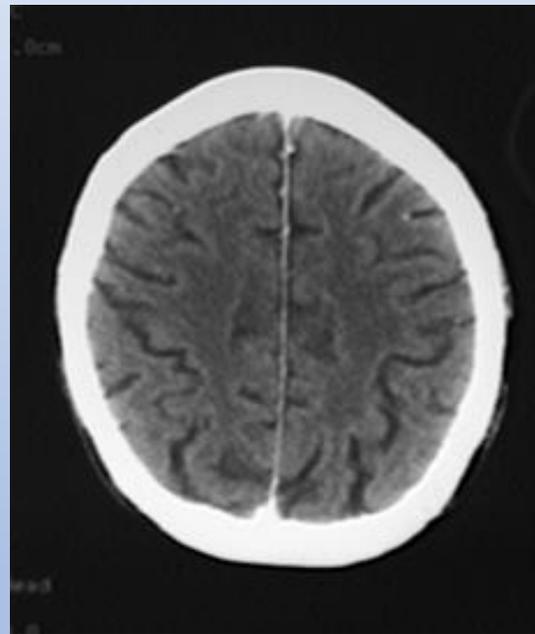
Collection of information about an object without being in direct contact with that object



Medical examples



X-rays



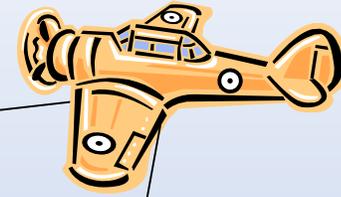
Cat-scans



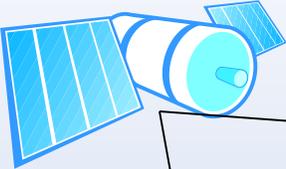
A photograph



An aerial photograph



A satellite image



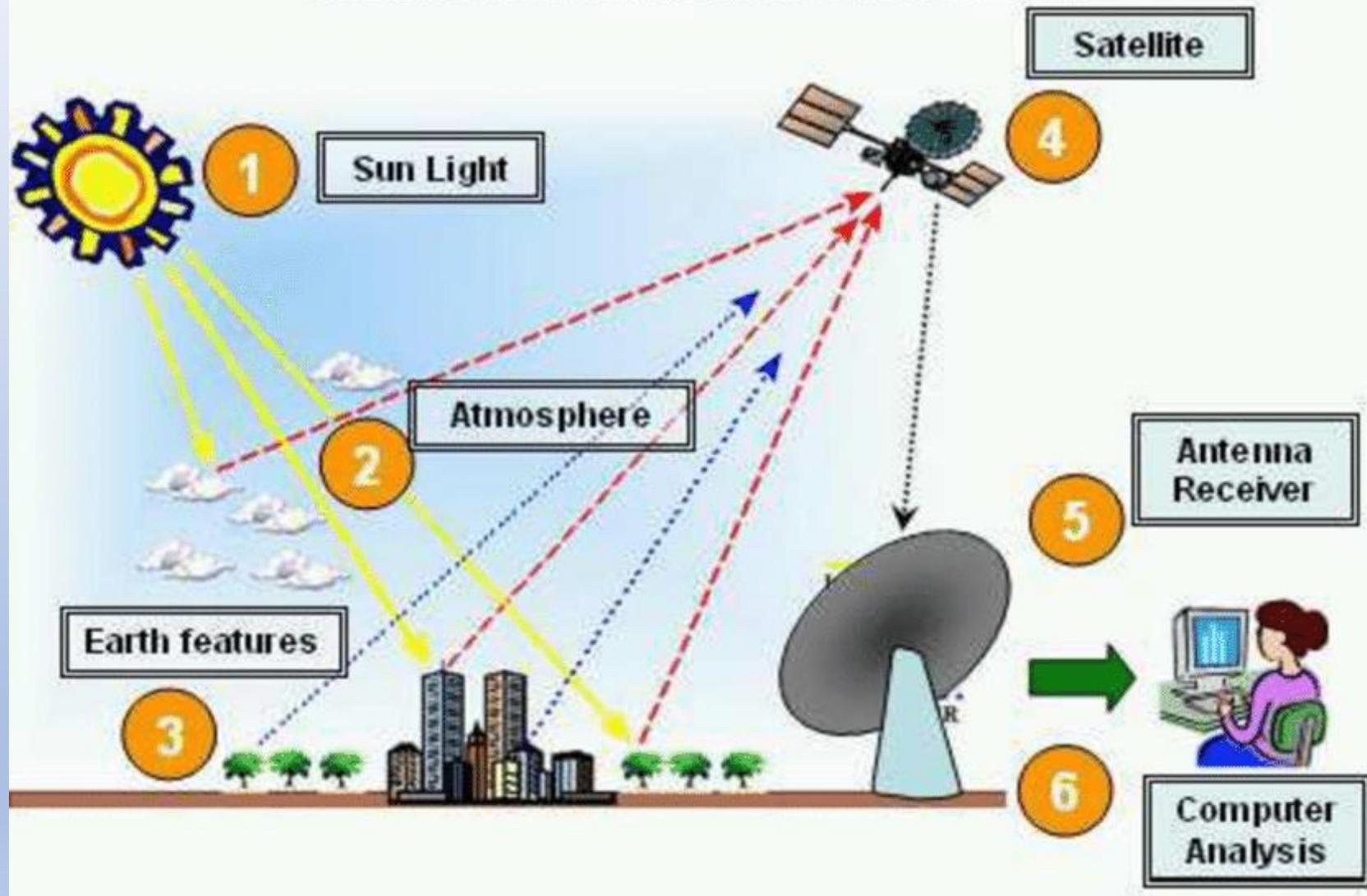
Lake Erie

**Downtown
Cleveland**

Cleveland
International
Airport

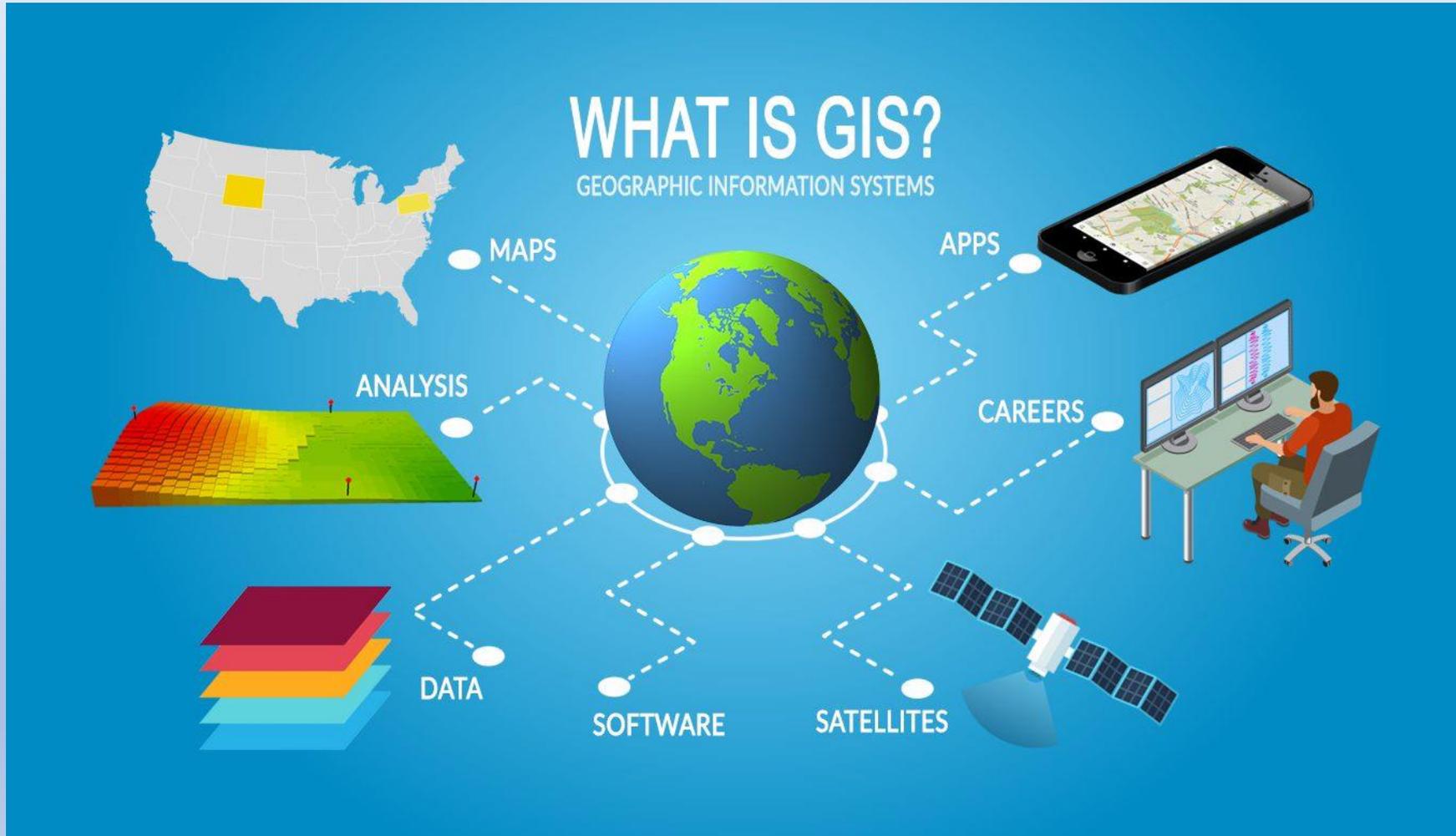


REMOTE SENSING PROCESS

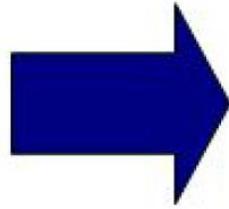
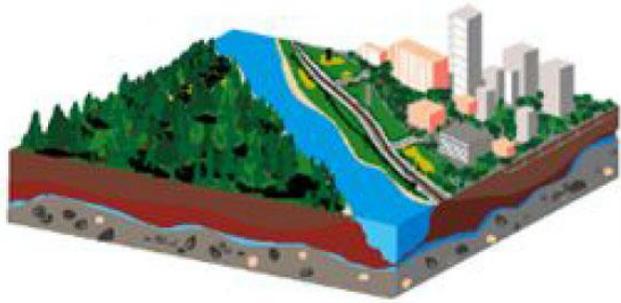


What is GIS?

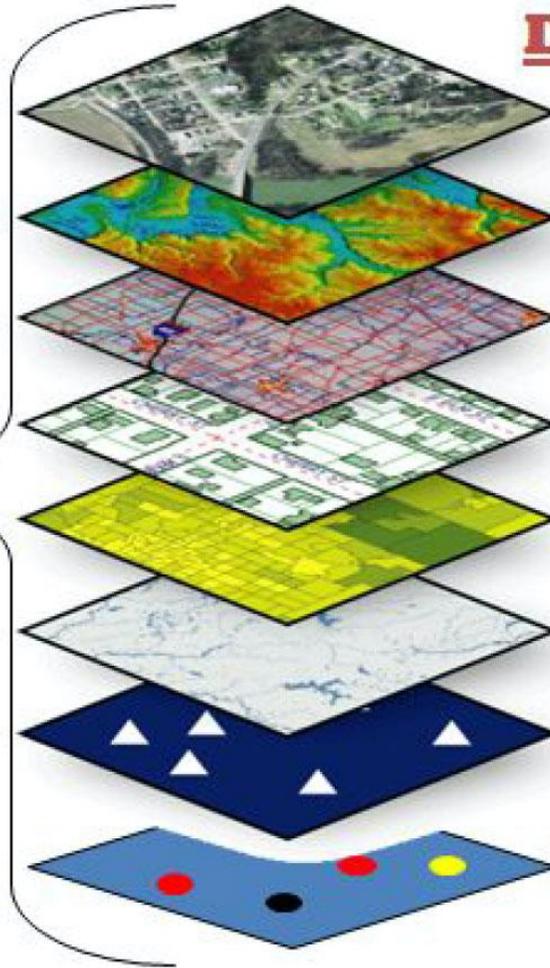
Geographic Information Systems



The Real World



GIS World Model



Data Slices

Imagery

Elevation

Transportation

Addresses

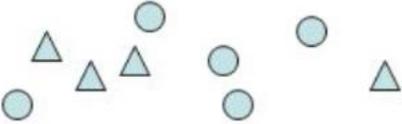
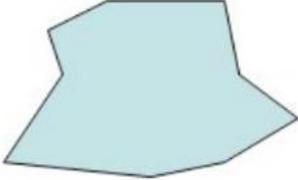
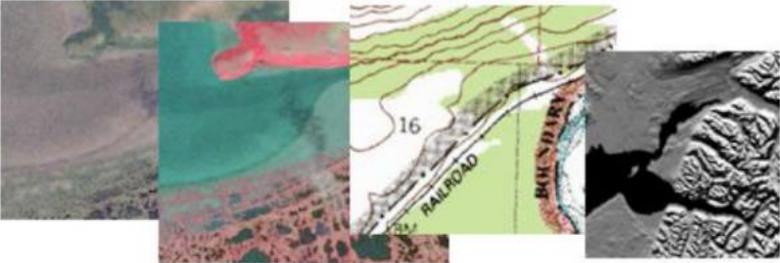
Boundaries

Water Features

Survey Control

Your Data

Types of GIS Symbols

Type	Symbol	Example
<ul style="list-style-type: none"> Points 		<ul style="list-style-type: none"> Towns, points of interest, campgrounds,...
<ul style="list-style-type: none"> Lines 		<ul style="list-style-type: none"> Rivers, roads, railroads,...
<ul style="list-style-type: none"> Polygons 		<ul style="list-style-type: none"> States, countries, boroughs,...
<ul style="list-style-type: none"> Images 		<ul style="list-style-type: none"> Satellite image, topographic map, shaded relief,...



(Source: https://saylordotorg.github.io/text_essentials-of-geographic-information-systems/s11-02-multiple-layer-analysis.html)

- END OF DAY 1 TALK – LET'S START USING ARCGIS ONLINE!

