

Aerial Imagery

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Aerial Photography Field Office





Aerial Imagery Platforms

- Balloons
- Rockets
- Kites
- Pigeons
- Airplanes, Helicopters, UAV's
- Satellites, Space Shuttle, Space Station





View of Boston from Balloon

Queen of the Air, 1860





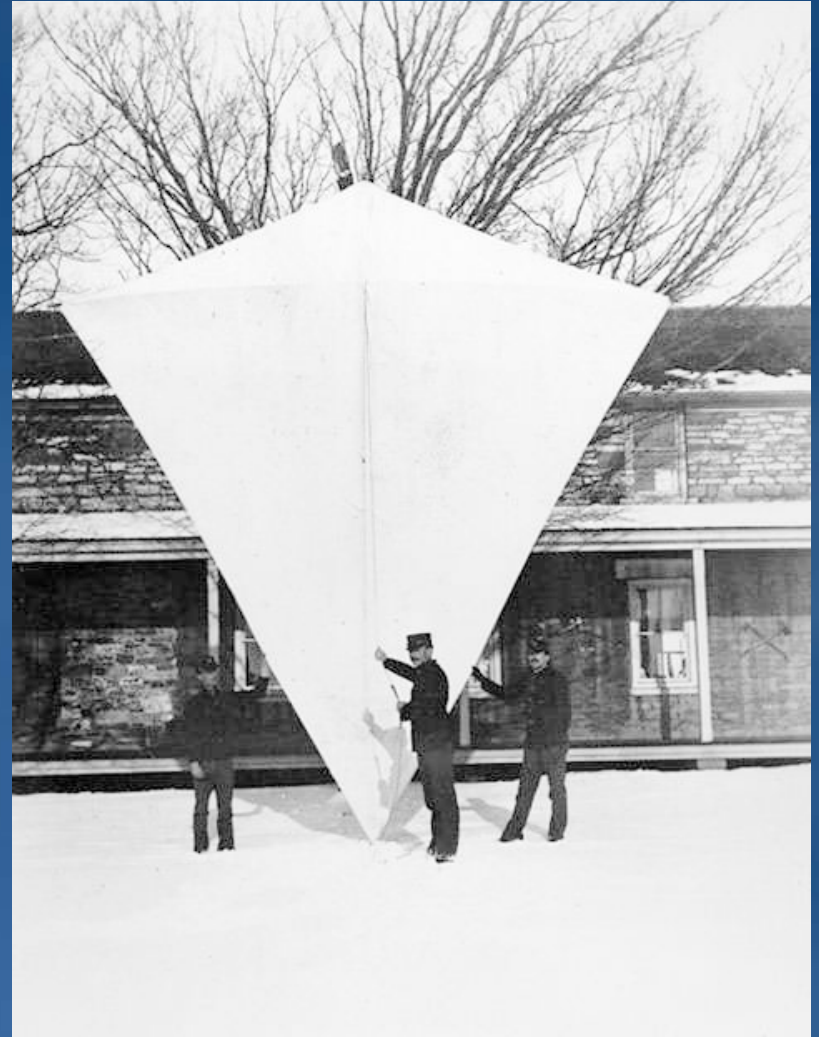
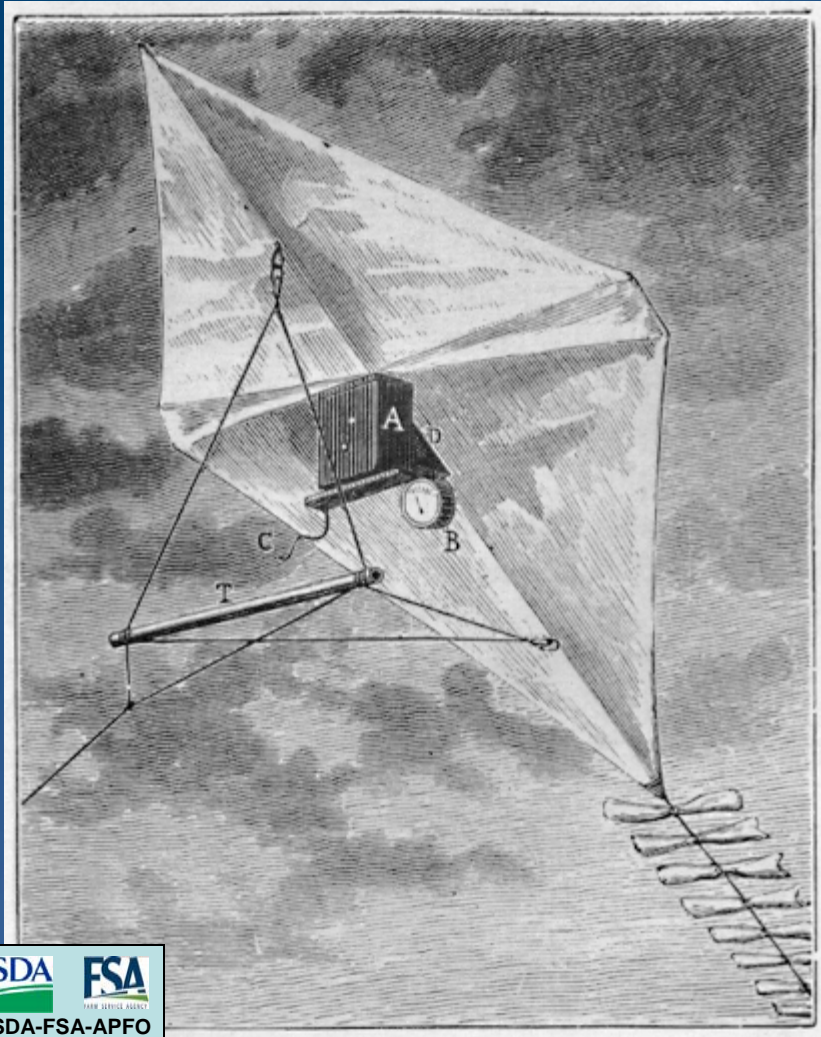
View of German Landscape by Alfred Maul's Rocket, 1904





Kite Cameras

Arthur Batut and Lt. Hugh Wise





View of San Francisco from a Kite, 1906



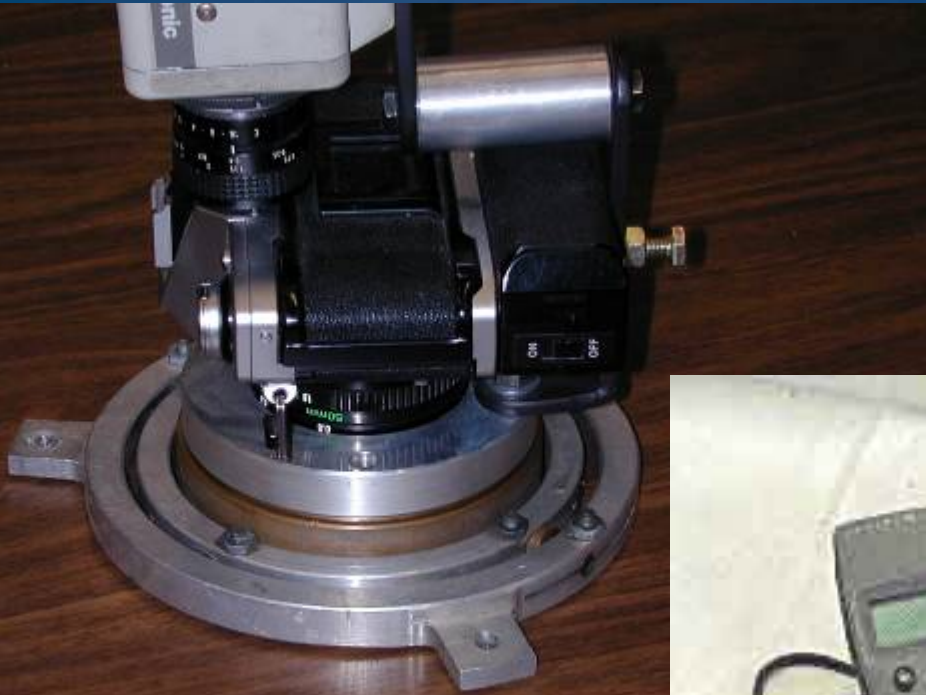
Pigeon Camera

Patented by Julius Neubronner, 1903





35mm Aerial Photography





Large Format Aerial Photography

9"x9" Film



9" x 9" Film Canister





US Department of Agriculture

Salt Lake City, Utah

Over 10 million frames from 1955 to present



Image Acquisition

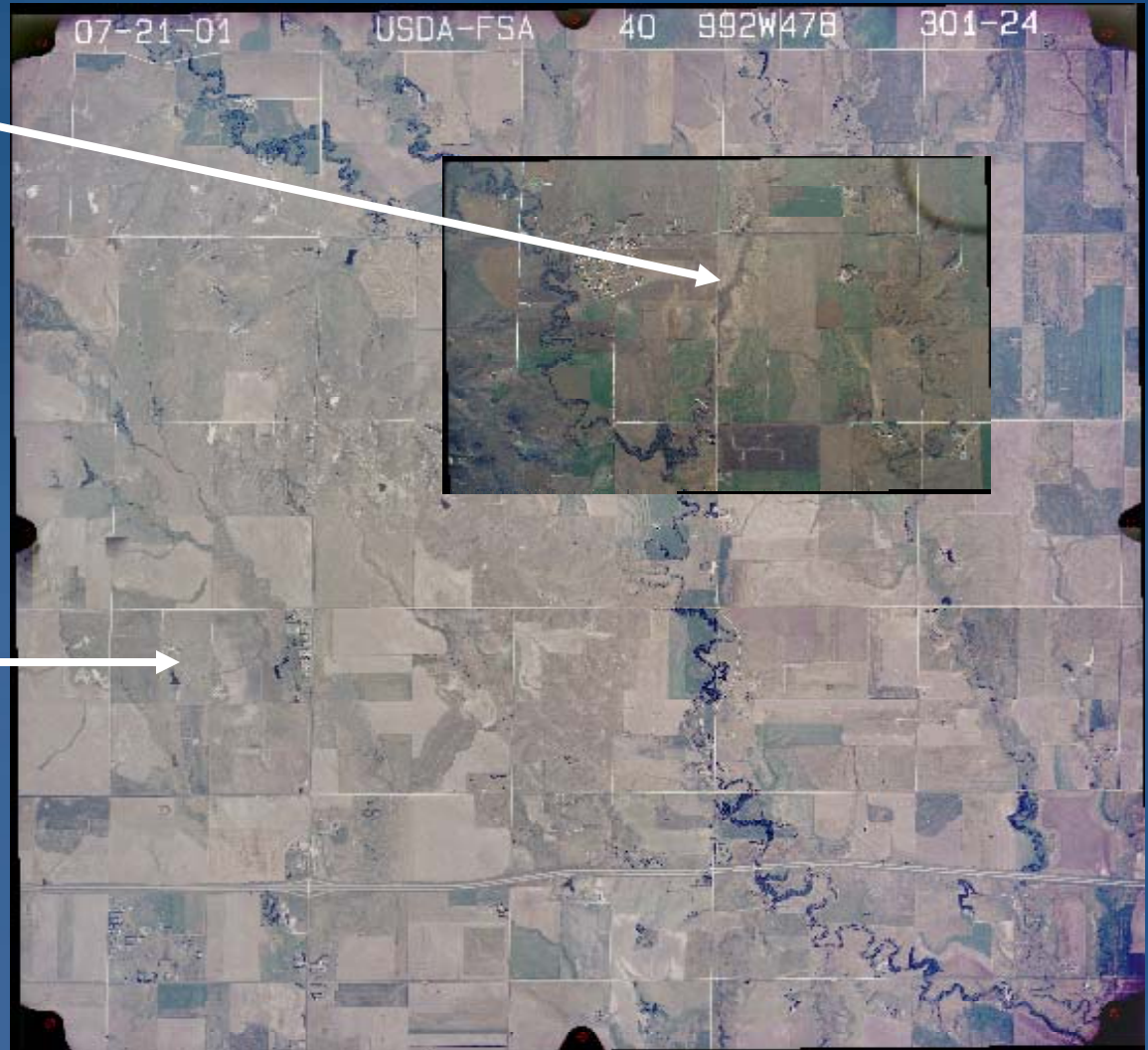
Film and Digital

Small Format

- 35mm Film Camera
- 3 sq. miles @ 8,000 feet

Large Format

- Mapping Camera
- 9"x 9" film
- 25 sq. miles @ 20,000 feet





Large Format Digital Aerial Cameras





Image Acquisition Always Changing

Pigeon to Predator





UAV, UAS, UCAV

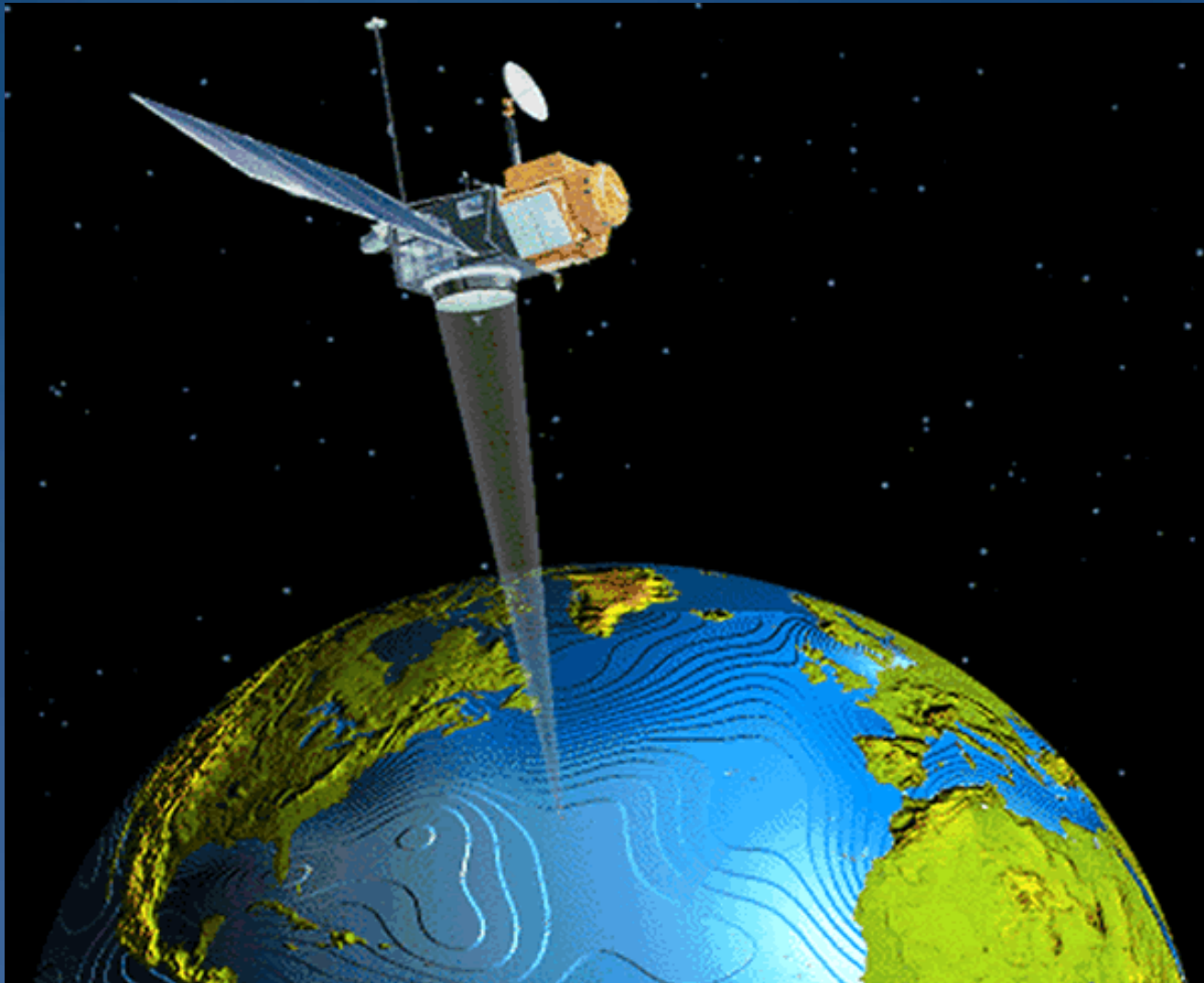
Unmanned Aerial Vehicle, Systems, Combat





Satellites

Satellite, Space Shuttle, Space Station





Before GIS

Paper photos





Measure & Draw on the Photographs





GIS

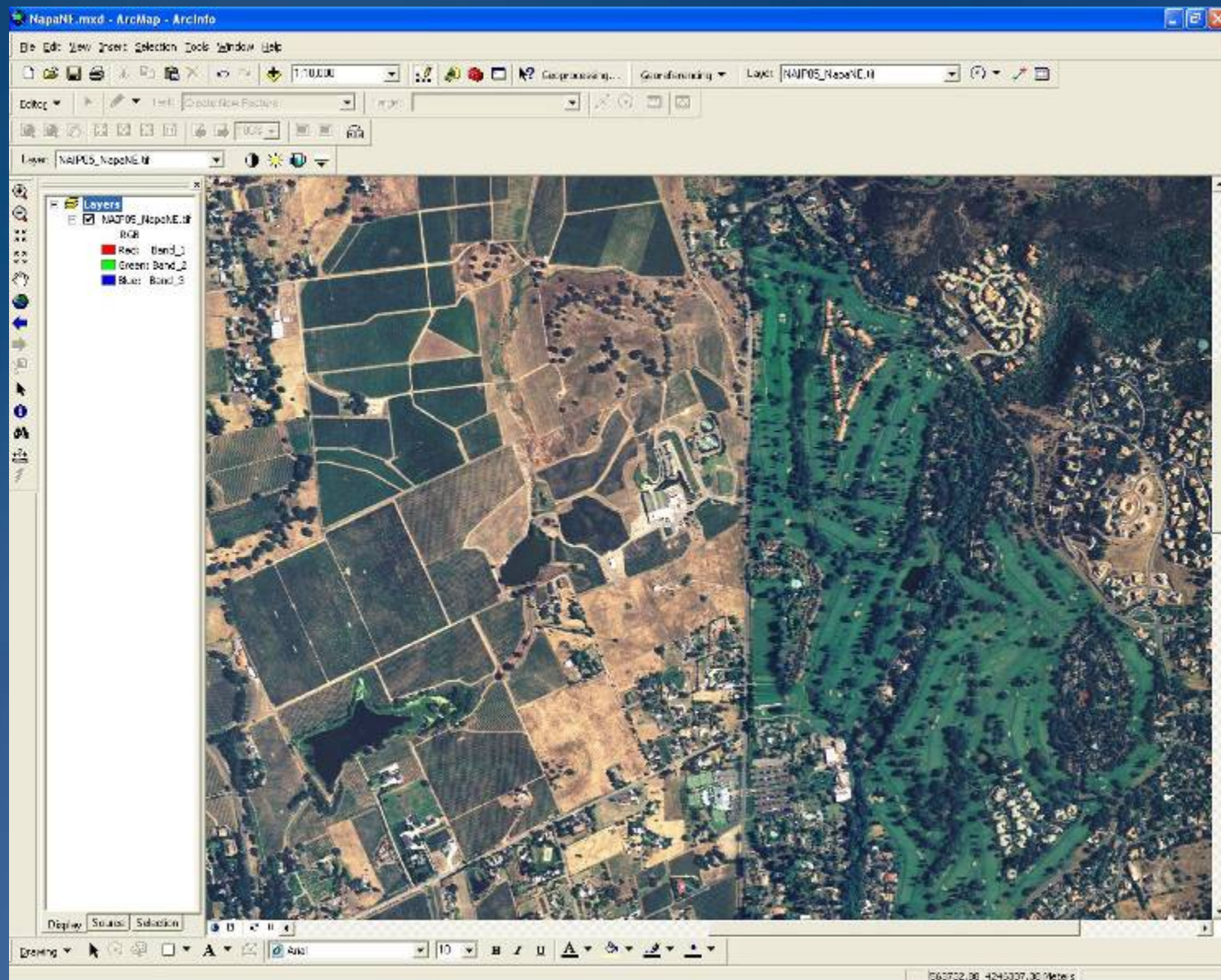




Photo Identification

- Basics

- Shape, tone, location, texture, size, pattern, shadow, association
- Buildings, roads, rivers, railroad, fields

- Change over time

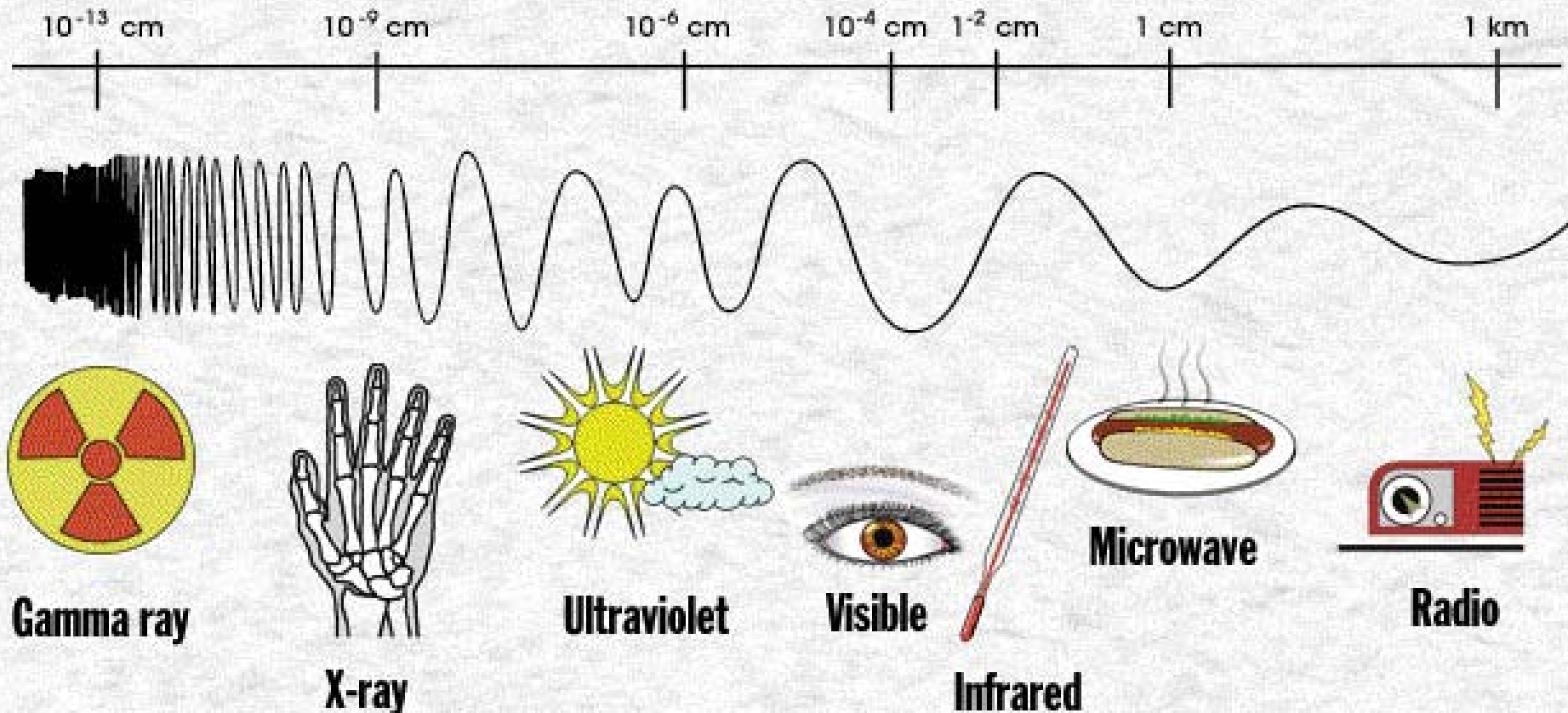
- Fields and homes, new roads, commercial sites
- Time machine. Can see back in time.

- Identify places we haven't seen before

- Cities, states, countries, buildings, rivers,



The Electromagnetic Spectrum

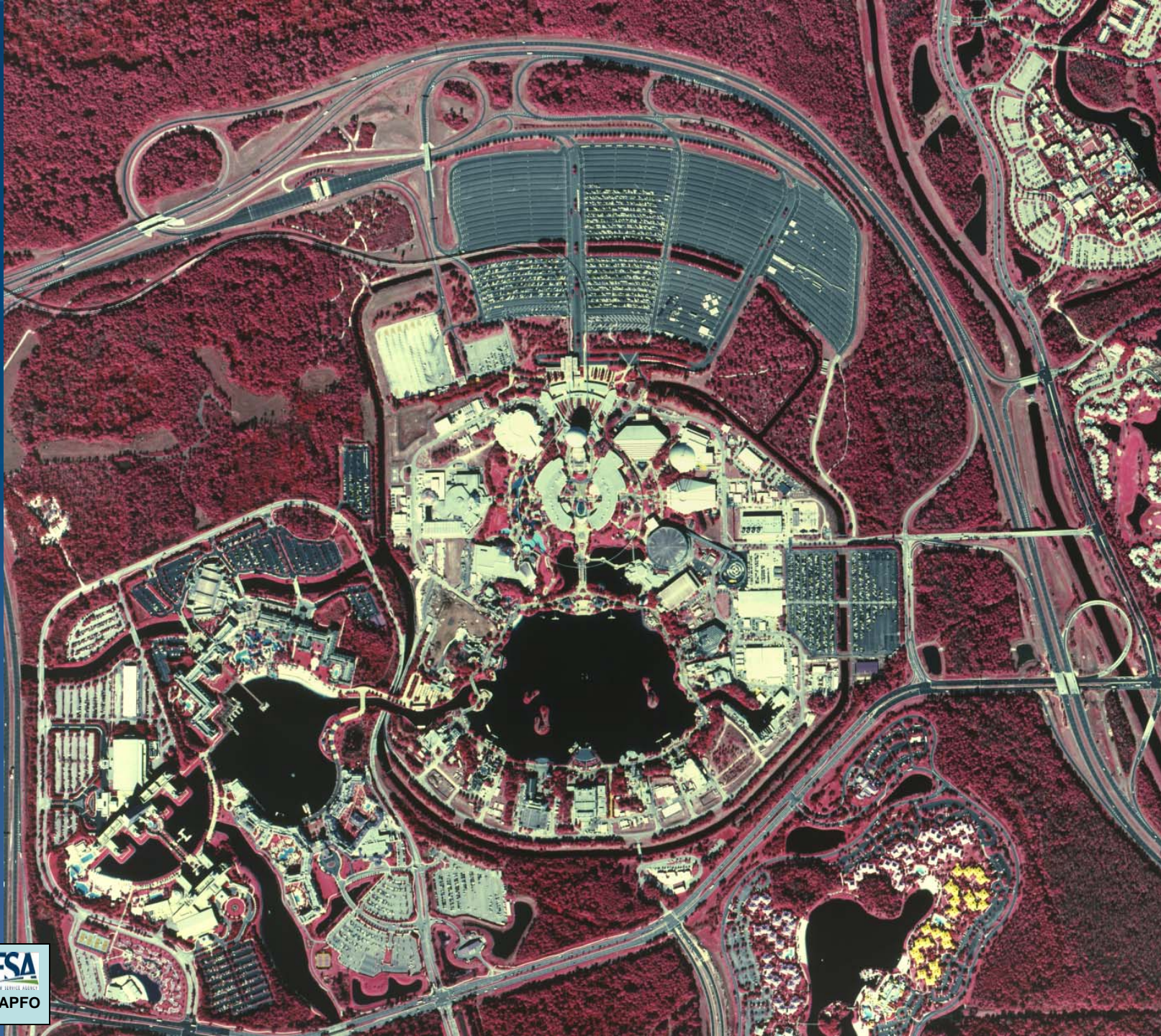


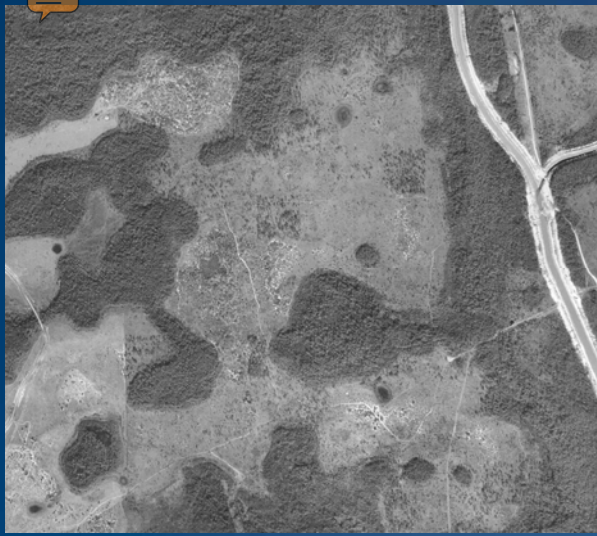


Where was this photo taken?





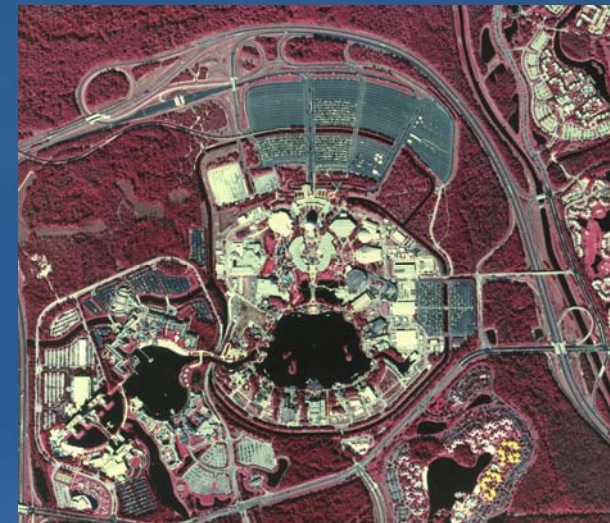




1969



1980



1998



Where was this photo taken?



Dasht-e Kevir, Iran

- Dasht-e Kevir
Image taken 10/24/2000 The Dasht-e Kevir, or valley of desert, is the largest desert in Iran. It is a primarily uninhabited wasteland, composed of mud and salt marshes covered with crusts of salt that protect the meager moisture from completely evaporating.
- Dasht-e Kevir can be found on Landsat 7 WRS Path 162 Row 36, center: 34.62, 54.71.
- USGS Earth As Art
<http://earthasart.gsfc.nasa.gov/kevir.html>

Online Maps & Imagery

Downtown Salt Lake City (Nov 2009)

salt lake city, ut - Google Maps - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: <http://maps.google.com/maps?hl=en&ll=40.760131,-111.893611> Go Link Convert Select

Web Images Videos Maps News Shopping Gmail more

Help | Sign in

Google maps salt lake city, ut Search Maps Show search options

Find businesses, addresses and places of interest. Learn more.

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Directions Search nearby Save to... more

Explore this area

Photos

Places

Gateway District
Trinley Square
Joseph Smith Memorial Building

User-Created Maps

Five Day Trips from Salt Lake City, Utah
by Mark - 15,755 views

Utah for Free
by Craig - 2,775 views

Top Contributors

by reviews, maps and edits


The Travel Landing maps edit
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More info about Salt Lake City, UT

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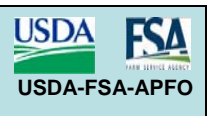
USDA FSA
NEW UNITED STATES
USDA-FSA-APFO



Map controls: Traffic, More..., Map, Satellite, Terrain

Map data: © 2009 Google

Downtown Salt Lake City (Nov 2009)







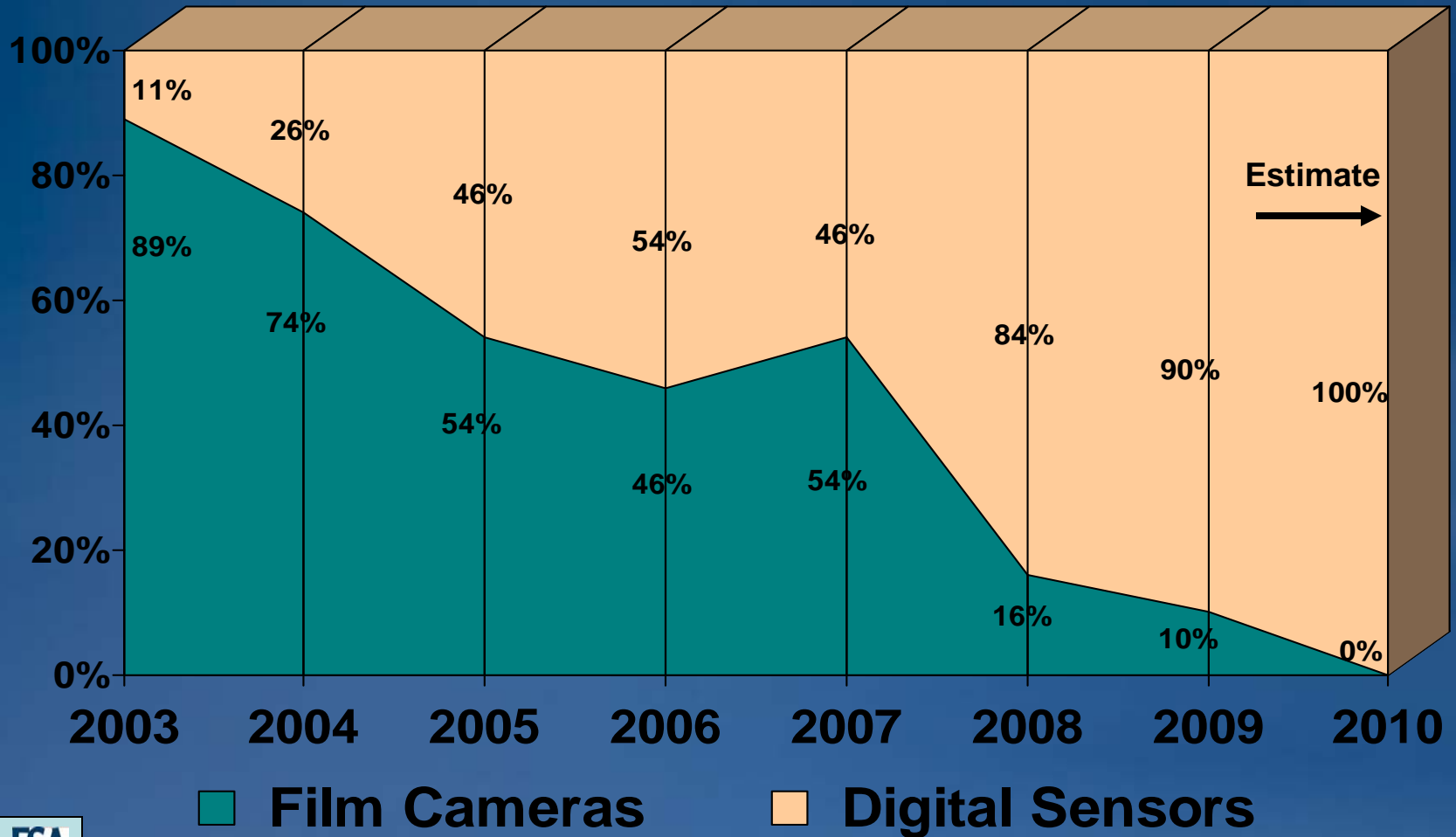


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Aerial Photography Field Office
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NAIP Camera Trends

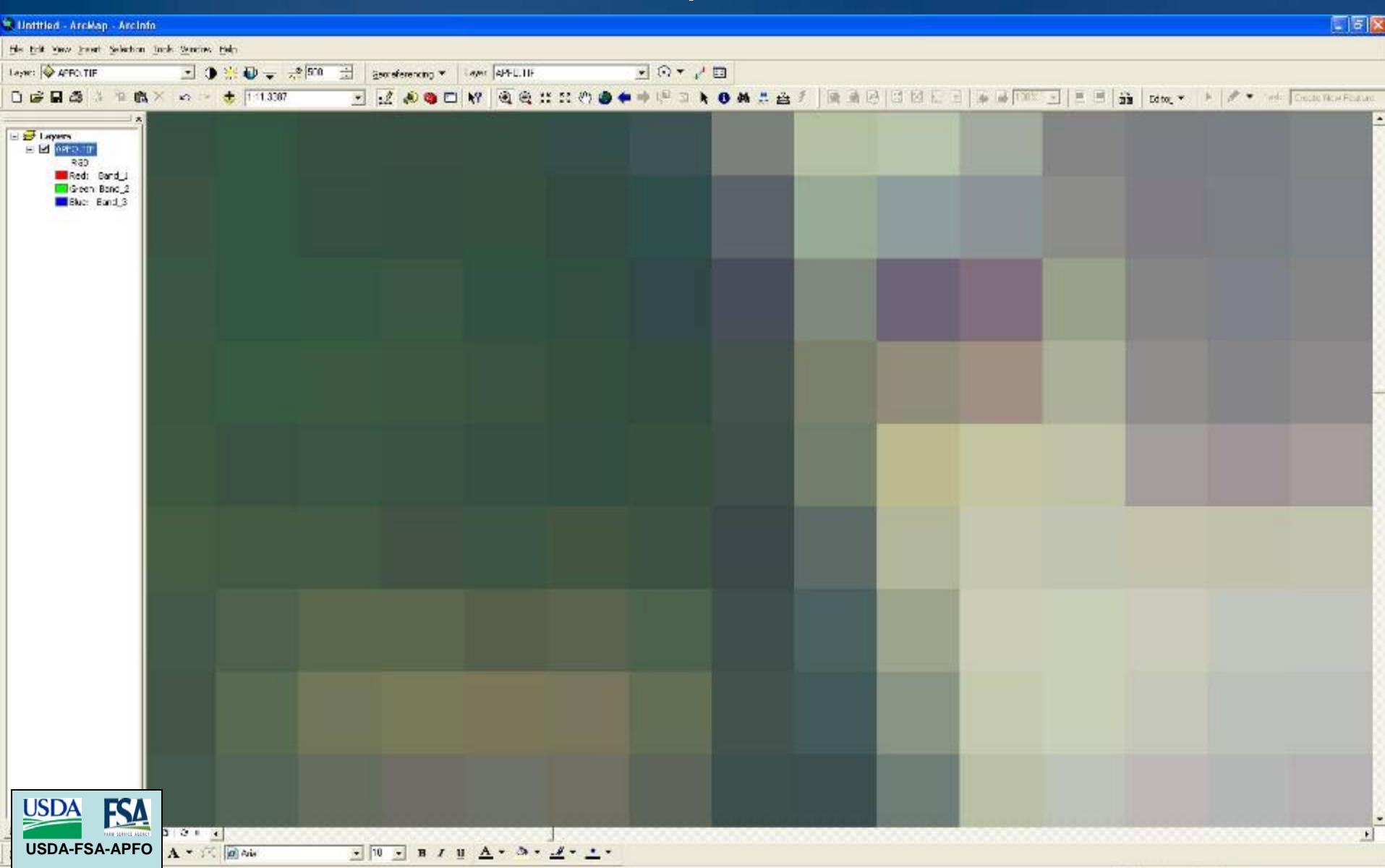
Film Cameras vs. Digital Sensors





Pixels

Ground Sample Distance





Aerial Imagery Options

- Oblique or vertical
- Number of bands
 - 1 Grayscale, 3 RGB or CIR, 4 RGBI_r, 8
- Ground Sample Distance (pixel resolution)
- Data format
 - Raw, TIFF, JPEG, GeoTIFF, MrSID, JP2, ...
- Leaf-on, leaf-off, flying date, flying season
- Coverage
- Others



GIS & Remote Sensing Careers

- Careers vs. Jobs
 - Short & long term opportunities
 - What is interesting and enjoyable
 - Required education
 - Salary, benefits, stability
 - Benefit to yourself, your family, your community

GIS & Remote Sensing Careers

- Acquiring aerial imagery
 - Aircraft
 - UAVs
 - Satellite
 - Government, Military, & Business
- Sensors
 - Satellites
 - Cameras
 - LiDAR, Radar, other non-imagery sensors

GIS & Remote Sensing Careers

- Storing & Archiving
 - Image files are ENORMOUS (petabyte capacity equipment)
 - Short and long term storage
 - Data formats, including compression
- Creating orthoimagery
 - GPS, ground control, DEM
 - Rectification, photogrammetry
 - Image manipulation, tone balancing, etc
- Serving and Web Services
 - Data downloads
 - Web browser viewers
 - View from GIS or other desktop software

GIS & Remote Sensing Careers

- Creating data from imagery
 - Digitizing roads, street lights, parcels,
 - Land use & land cover change
- GIS & Remote Sensing Applications
 - Real Estate
 - Police, Fire, Emergency services
 - Health, disease tracking
 - Business location
 - Routing for garbage collection
 - Web services
 - Vehicle GPS and Mapping
 - Google Maps, Bing, others