BASICS OF AERIAL PHOTOGRAPHY GEOMETRY

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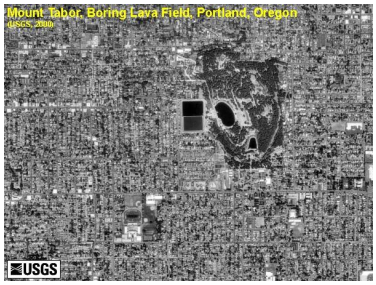
Major Aspects to Consider

- Vertical, Tilted, and Oblique Angles
- Nadir
- Isocenter
- Principal Point
- Focal Length
- Photo Scale
- Field of View

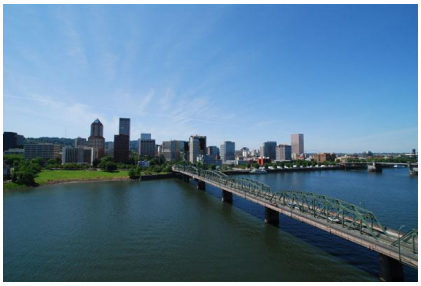
Vertical, Tilted and Oblique Photographs

Vertical or Tilted Angle Photographs



- Tilted photographs have 3% or less tilt
- True Vertical photograph
- Reduced Image distortion
- Nearly constant scale

High and Low Angle Oblique Photographs



- Oblique photographs are defined by having more than 3% tilt
- Large coverage area
- Familiar perspective

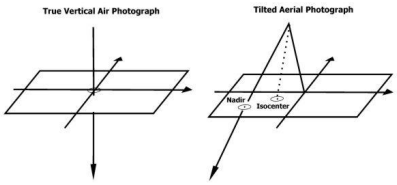
Nadir

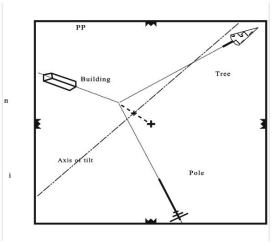
- Nadir is the point or line directly below the collection instrument
- Topographic displacement affects often increas from Nadir
- A means for calculating location and height during collection process

A - Nadir Point
B - Nadir Line

Isocenter

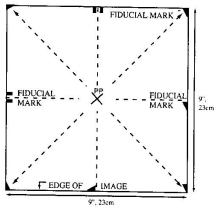
- Point that falls between Nadir and the Principal Point
- A result of the oblique angle of the photograph
- Axis of tilt in the photograph
- Tilt displacement affects increase away from the Isocenter of the photograph

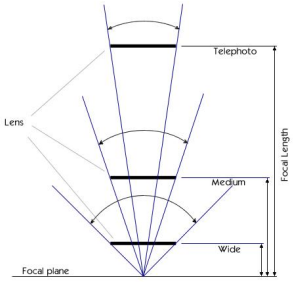




Principal Point and Field of View

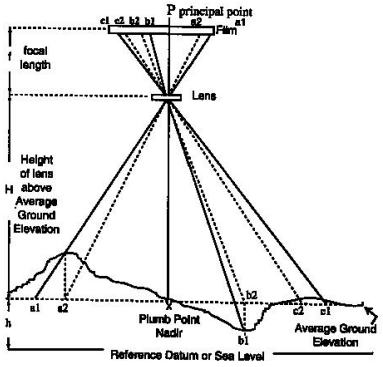
- Principal Point is determined by the photographs Fiducial Marks
- Point of least distortion
- Field view is affected by:
  - Lens Design
  - Focal Length
  - Size of Negative
  - Acceptable Distortion





Focal Length and Scale

- Focal Length
  - Photograph Height
  - Field of View
  - Photograph Clarity
- Scale is determined by the focal length of a lens/ photograph height.
- Focal Length = 4cm
  Flying Height = 100000cm
  4/100000 = Scale 1/25,000



Discussion Questions

1. How is the Principal Point determined from aerial photographs?
2. What aspects of photographic geometry cause differences between Nadir and the Principal Point?
3. Why are most aerial photographs taken from a tilted angle opposed to a vertical position?
4. What two aspects of aerial photography are used to define the scale of a photograph, and how are they calculated?

Sources

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