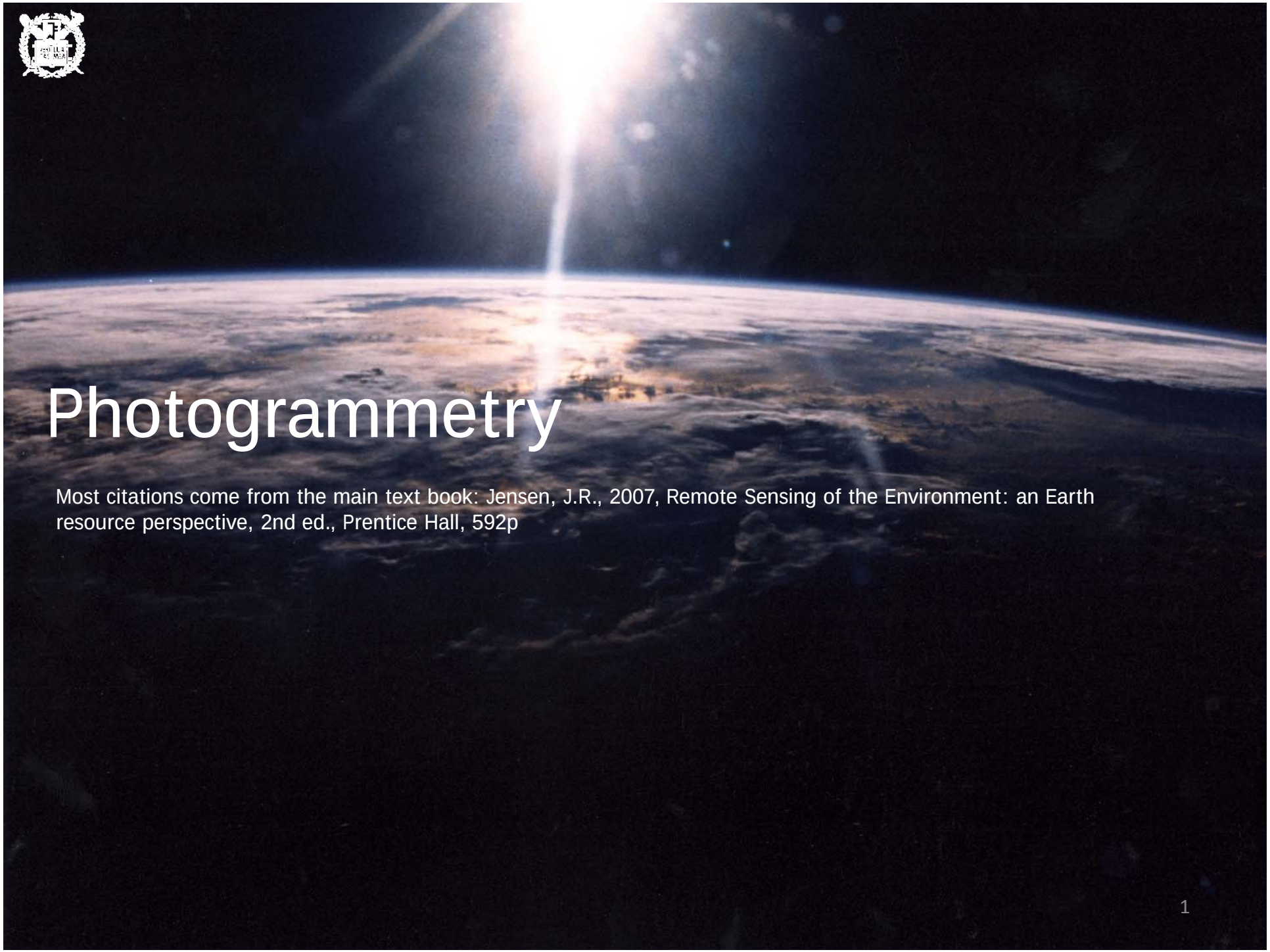

Photogrammetry

Most citations come from the main text book: Jensen, J.R., 2007, Remote Sensing of the Environment: an Earth resource perspective, 2nd ed., Prentice Hall, 592p

Photogrammetry

- Important measurements that can be obtained from a single vertical aerial photograph using analog or digital photogrammetric techniques
  - scale of photography
  - object height
  - object length
  - area of an object or polygon
  - perimeter of an object or polygon
  - the grayscale tone or color of an object
- The quantitative measurements may be made using multiple (overlapping) stereoscopic aerial photographs and analog or digital measurement of stereoscopic parallax
  - precise planimetric (x, y) object location of building footprints, streets, hydrology, and shorelines in a standard map projection
  - precise object height
- digital photogrammetric techniques applied to stereoscopic aerial photography can yield:
  - digital elevation models (DEM)
  - bathymetric models

Flightlines of Vertical Aerial Photography

- Flightlines of Vertical Aerial Photography

Flightlines of Vertical Aerial Photography

- Flightlines of Vertical Aerial Photography

Fiducial Marks and Principal Points

- Fiducial Marks and Principal Points

Fiducial Marks and Principal Points

- Fiducial Marks and Principal Points

Geometry of Vertical Aerial Photography

- Geometry of Vertical Aerial Photography

Scale and Height Measurement on Single Vertical Aerial Photographs

- Scale of a Vertical Aerial Photograph over Level Terrain
  - s=ab/AB
  - s=f/H

  - s=0.012”/6’=0.012”/72”=1”/6000”

Scale and Height Measurement on Single Vertical Aerial Photographs

- Scale of a Vertical Aerial Photograph over Variable Terrain
  - $s=f/(H-h)$
  - $s_{min}=f/(H-h_{min})$
  - $s_{max}=f/(H-h_{max})$
  - $s_{avg}=f/(H-h_{avg})$

Scale and Height Measurement on Single Vertical Aerial Photographs

- Height Measurement from Single Aerial Photographs
  - d: relief displacement

Scale and Height Measurement on Single Vertical Aerial Photographs

- Height Measurement Based on Shadow Length

Stereoscopic Measurement of Object Height or Terrain Elevation

- Fundamentals of Human Stereoscopy
  - stereoscopic parallax: the change in position of an object with height, from one photograph to the next relative to its background, caused by the aircraft's motion
  - stereoscopy: the science of perceiving depth using two eyes

Stereoscopic Measurement of Object Height or Terrain Elevation

- Stereoscopy Applied to Aerial Photography
  - Methods of Stereoscopic Viewing

Stereoscopic Measurement of Object Height or Terrain Elevation

- Stereoscopy Applied to Aerial Photography
  - Lens and Mirror Stereoscopes and Stereo Cameras

Stereoscopic Measurement of Object Height or Terrain Elevation

- Stereoscopy Applied to Aerial Photography
  - Stereo Cameras
  - Viewing Stereoscopic Aerial Photographs

Stereoscopic Measurement of Object Height or Terrain Elevation

- Stereoscopy Applied to Aerial Photography
  - Stereoscopic Aerial Photography – How Does It Work?

Stereoscopic Measurement of Object Height or Terrain Elevation

- Stereoscopy Applied to Aerial Photography
  - Stereoscopic Aerial Photography – How Does It Work?

parallax equation

$h_0=(H-h) \times dp / (P+dp)$

P: absolute stereoscopic parallax, average photo air base

dp: differential parallax

Stereoscopic Measurement of Object Height or Terrain Elevation

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Digital Elevation Models, Orthophotos and Planimetric Features using Soft-copy Photography

- Creation of Digital Orthoimages

Digital Elevation Models, Orthophotos and Planimetric Features using Soft-copy Photography

- Creation of Digital Orthoimages

Area Measurement

- Area Measurement of Irregular Shaped Polygons