

AERIAL PHOTO

Also known as **remote-sensing photography**

Taking image of the Earth from the **elevated position** or from the air

Records the ever-changing **cultural and natural features** on the Earth's surface.

Can be done using **satellite, planes, drones**



1827

Heliography technique



1st ever photo, taken by Joseph Nicéphore Niepce

1858 - 1914

Balloons & Kites



Captive Airships

Gaspard Felix Nadar

1903

Camera mounted on pigeon patented



invention of rolled paper film

Maul Camera Rocket



WW1 for aerial reconnaissance

1920 - 1939

Fairchild's aerial camera system



1956

U2 spy planes



1957

Sputnik 1 - artificial satellite



1960

TIROS -1 Spacecraft



1965

Landsat-1



Introduced remote sensing

New Discovery

War/ Military Appliance

Resource Planning & Management

FUNCTION

Aerial photo is useful in landscape design such as inventory stage. The functions of aerial photo including:

Precision agriculture & rangeland monitoring

- Landcover mapping & classification
- Crop health monitoring
- Modeling biophysical attributes
- Studying soil characteristic

Natural disaster management

- Thermal disasters
- Ground displacement
- Flood

Aquatic ecosystem management

- Mapping & Monitoring
- Characterizing water bodies

Polar remote sensing

- Mapping of ice cover, permafrost patterns, periglacial processes, vegetation

Wildlife research

- Bird & mammal detection





Reduce Emissions

- Can remote access easily without travel and visit to the site face to face.
- Use less CO2 compared to the vehicles



Protect Natural Resources

- Provide detailed imagery for further preservation plan.
- Helps the planner to get the information using the most effective ways
- Able to do site inventory as well as in the condition of low risk.

ROLES



Documenting Effects of Climate Change

- Climate change is happened in a a slow time scale
- Give a more accurate perspective to understand about climate change by visual photography.
- Easy for comparison, can notice the disaster or the weakness of the site

Types of Aerial Photography

Primary Aerial Photograph Characteristics

1. **tone or color:** the relative brightness of hue of patches.
2. **shape:** the manner which related groups of pixels are arranged; the complexity of a feature or patch border.
3. **size:** the number of pixels that aggregate to form a group of pixels with similar characteristics.
4. **pattern:** the spatial arrangement and repetition of features (group of pixels) across an area.
5. **texture:** the frequency of change in tone among pixels: smoothness or roughness.
6. **shadows:** the combination of dark or "shadow" pixels adjacent to brighter pixels.
7. **Local characteristics:** condition at the feature or patch level.
8. **Landscape context:** Conditions adjacent to or surrounding a feature or patch.



- Use airborne camera with sensitive silver halide crystals on backing material & a series of emulsions
- Types of camera: film-based and digital cameras
- **film-based:** with lenses of high geometric quality to minimize distortion
- film-based is finer than digital-camera



- With the aid of digital apps such as GIS
- Convert film-based photographs into digital format through scanning
- **challenge:**
 - high cost
 - a potential loss of radiometric or tonal variation and spatial resolution from the photograph
 - Cannot show the accurate detail photograph

Advantages

-  Safe (surveillance and fire-fighting schemes)
-  Cost-effective
-  Capacity to follow track lines more accurately
-  Record and do documentary for landscape changes
-  Obtain fine-scale landscape easily
-  high spatial resolution

Challenges

Depends on humans:

-  Different of technique using aerial photography based on personal experience.
-  Uncontrol human's interpretation due to different opinions.
-  Lack of well-trained interpreters.
-  Limited or inconsistent metadata such as historic photo-graph.

Depends on nature:

-  unable to deal with uncertain conditions (eg. gusty winds, smoke haze)

Examples

- Super Tree Grove, Singapore



Natural resource Cultural resource



Cultural landscape



- Cameron Highlands, Pahang



- Paddy fields, Kuala Selangor

Natural landscape



- Gunung Mulu National Park, Sarawak



- Kinabatangan River, Sabah

References

- Jessica L. Morgan, Sarah E. Gergel, Nicholas C. Coops (2023), Aerial Photography: A Rapidly Evolving Tool for Ecological Management
- Wikipedia, "Aerial Photography"
- Government of Canada, 2022-04-25, "About Aerial Photography"
- Government of Canada, 2016-09-01, "Concepts of Aerial Photography"
- Government of Canada, 2016-11-17, "Introduction to Air Photo Interpretation"
- Ronald J. Hall, January 2003, "The Roles of Aerial Photographs in Forestry Remote Sensing Image Analysis"
- Abigail Bevan & Jack Bolton, 2023, "Landscape Aerial View in Malaysia"
- Priya Thakur Holidify, "nice landscape aerial view"