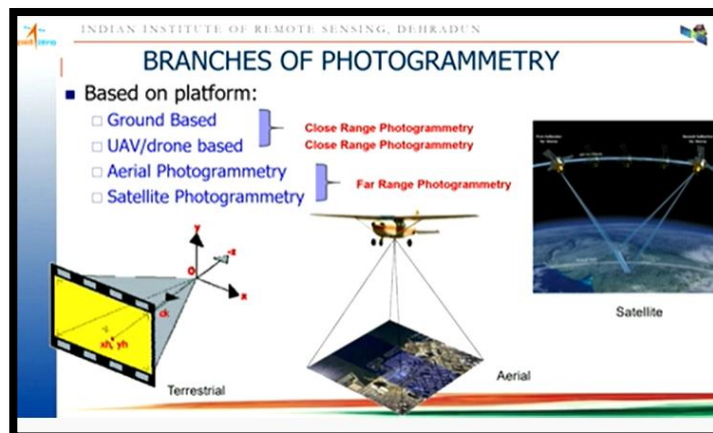
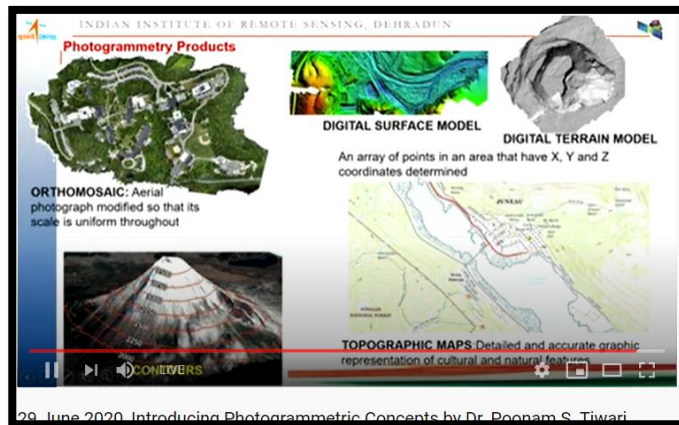


DAILY ASSESSMENT

Date:	29/06/2020	Name:	Davis S. Patel
Course:	IIRS Outreach Program on Satellite Photogrammetry and its Application	USN:	4AL16EC045
Topic:	Introduction to Photogrammetry Concepts	Semester & Section:	8 th - A
GitHub Repository:	Davis		

AFTERNOON SESSION DETAILS

Image of session



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WHAT IS PHOTOGRAMMETRY

- The science of quantitative analysis of measurements from photographs
 - **Photos** - light
 - **Gramma** - to draw
 - **Metron** - to measure

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Topographic map

Aerial photo

Map: It shows an area as seen vertically from above. Different symbols and colours are used to represent various objects on a map.

Aerial Photo: They are taken from an aircraft to show objects on the ground. They can be divided into vertical aerial photos and oblique aerial photos.

Map	Aerial Photo
Orthogonal projection	Central projection
Uniform scale	Variable scale
Terrain relief without distortion	Relief displacement
All objects represented on a particular scale	Only objects that are visible
Abstract representation	Real representation
Representation geometrically correct	Distortions in geometry

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REPORT –

Photogrammetry, as its name implies, is a 3-dimensional coordinate measuring technique that uses photographs as the fundamental medium for metrology (or measurement). The fundamental principle used by Photogrammetry is triangulation or more specifically called Aerial Triangulation. By taking photographs from at least two different locations, so-called “lines of sight” can be developed from each camera to points on the object. These lines of sight (sometimes called rays owing to their optical nature) are mathematically intersected to produce the 3-dimensional coordinates of the points of interest.

The expression photogrammetry was first used by the Prussian architect Albrecht Meydenbauer in 1867 who fashioned some of the earliest topographic maps and elevation drawings. Photogrammetry services in topographic mapping is well established but in recent years the technique has been widely applied in the fields of architecture, industry, engineering, forensic, underwater, medicine, geology and many others for the production of precise 3D data.

Branches of photogrammetry

There are two broad based branches in photogrammetry

- **Metric Photogrammetry** : Deals with the precise measurements and computations on photographs regarding the size, shape, and position of photographic features and/or obtaining other information such as relative locations (coordinates) of features, areas, volumes, These photographs are taken using a metric camera and is mostly used in the engineering fields e.g. surveying etc
- **Interpretive Photogrammetry**: Deals with recognition and identification of the photographic features on a photograph such as shape, size, shadow, pattern etc. to add value and intelligence to information seen on the photograph (annotation).

Remote Sensing is a closely aligned technology to photogrammetry in that it also collects information from imagery. The term is derived from the fact that information about objects and features is collected without coming into contact with them. Where remote sensing differs from photogrammetry is in the type of information collected, which tends to be based on

differences in color, so land use and land cover is one of the primary output of remote sensing processing. Remote sensing was originally conceptualized to exploit the large number of color bands in satellite imagery to create 2D data primarily for GIS. Nowadays remote sensing tools are used with all types of imagery to assist in 2D data collection and derivation, such as slope. Software tools today tend to hold a much wider range of image technologies such as image mosaicking, 3D visualization, GIS, radar as well as softcopy photogrammetry.

Fundamentals of photogrammetry

The fundamental principle used by photogrammetry is triangulation. By taking photographs from at least two different locations, so-called “lines of sight” can be developed from each camera to points on the object. These lines of sight are mathematically intersected to produce the 3-dimensional coordinates of the points of interest.

Parallax

We might observe that objects seem in different places if you close one of your eyes. One can do this exercise by observing the same object by closing one eye and then the other. The displacement of an object caused by a change in the point of observation is called Parallax. Stereoscopic parallax is caused by taking photographs of the same object but from the different point of observation. Change in position of an image from one photo to the next is caused by aircraft’s motion.

Two important aspects of stereoscopic parallax:

- Parallax of any point is directly related to the elevation of the point
- Parallax is greater for high points than for low points

Stereo pair

The three-dimensional view which results when two overlapping photos (called a stereo pair), are viewed using a stereoscope. Each photograph of the stereo pair provides a slightly different view of the same area, which the brain combines and interprets as a 3-D view.

The photographs are usually taken by a series of a parallel passes called flight strip. Photographs are normally exposed in such a way that the area covered by each successive photograph along a flight strip duplicates or overlaps part of the coverage of the previous photograph.

This lapping along the flight strip is called end lap and the area of coverage common between two adjacent pairs of photographs called in a flight strip is called stereoscopic overlap (end lap).

Types of photogrammetry

Aerial Photogrammetry

The camera is mounted in an aircraft and is usually pointed vertically towards the ground with the camera axis vertical or nearly so. Many photographs are taken with the overlapping concept. Later the processing of these photographs is done using stereo-plotter. These photos are also used in automated processing for Digital Elevation Model (DEM) creation.

Terrestrial Photogrammetry

Photographs are taken from a fixed, and usually known, position on or near the ground and with the camera axis horizontal or nearly so. The position and orientation of the camera are often measured directly at the time of exposure. The instrument used for exposing such photograph is called photo theodolite.

Space Photogrammetry

In this branch of photogrammetry, the satellites are used to take photographs. With the development of modern-day satellite, a global coverage of satellite imageries is possible in lesser time with a high-resolution data.

Interpretative Photogrammetry

Under this process, the images are studied and identification is done for judging their significance with systematic and careful analysis.