**DAILY ASSESSMENT FORMAT**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date:** | **01-07-2020** | **Name:** | **Karthik J** |
| **Course:** | IIRS Outreach Program on Satellite Photogrammetry | **USN:** | **4AL16EC030** |
| **Topic:** | Introducing Photogrammetric Concepts | **Semester & Section:** | **8TH A** |
| **GitHub Repository:** | Karthik-J |  |  |

|  |
| --- |
| **FORENOON SESSION DETAILS** |
| **Image Section**          **Aerial Photogrammetry**  **Introduction**  Photogrammetry is a surveying and mapping technique which can be used in various applications. There are many uses of Photogrammetry in the surveying industry such as topographic mapping, site planning, earthwork volumes, production of digital elevation models (DEM) and orthophotography maps. It is also useful in a vast selection of industries such as architecture, manufacturing, police investigation, and even plastic surgery. The word “photogrammetry” is composed of the words “photo” and “meter” which means measurements from photographs. The classical definition of photogrammetry is: The art, science and technology of obtaining reliable information about physical objects and the environment, through processes of recording, measuring, and interpreting images on photographs  Photogrammetry is a skilled profession for the reason that obtaining reliable measurements requires certain skills, techniques and judgments to be made by the Photogrammetrist and experience is an advantage. It is a science and technology because it takes information from an image and transforms this data into meaningful results.  **Types of Photogrammetry**  There are two types of Photogrammetry, Aerial Photogrammetry and Terrestrial (Close Range) Photogrammetry.  • Aerial digital photogrammetry, often used in topographical mapping, begins with digital photographs or video taken from a camera mounted on the bottom of an airplane. The plane often flies over the area in a meandering flight path so it can take overlapping photographs or video of the entire area to get complete coverage.  • Close-range, or terrestrial, digital photogrammetry often uses photographs taken from close proximity by hand held cameras or those mounted to a tripod. Close-range photographs can be used to create 3D models, but they are not usually used in topographical mapping. This type of photogrammetry is useful for the 3D modelling of many objects or areas such as buildings, automobile accident scenes, or movie sets.  **Aerial Photogrammetry versus Traditional Surveying Techniques:**  Advantages:  • It is a permanent pictorial record of the significant area at that specific moment in time which is recorded with a metric camera (known interior orientation)  • The pictorial record also helps in minimizing field work. If certain data is missing or the information has to be re-evaluated it is not necessary to go back to site. The measurements can be done in the office with using the same photography. Thus this new information is acquired quicker due to the elimination of the field work.  • With aerial photogrammetry a largerarea can be mapped more resourcefully and economically than traditional survey methods.  • Photogrammetry can be used in areas that are unsafe and difficult to access. Whereas with traditional field work it has a disadvantagein terms of timeand the safety of the Survey team.  • When detail surveys of roads are required, roads don’t have to be closed or free flowing traffic disturbed. The safety of the survey team is kept to the minimum as they would not have to be physically on the road for long periods of time. Road features and important data can be obtained in the office from measurements made from the photographs.  • Intervisibilty between control points and intervisibilty between the area to be surveyed and control are not a requirement. This minimises excessive control surveys. Every point within the mapped area can be coordinated with no extra cost.  Disadvantages:  • Weather conditions could affect the quality of the pictureand the flight plan. Conditions such as snow might give a false representation of the ground  • The ground that is usually hidden by structures such buildings or by tree canopies and vegetation cannot be accurately mapped.  • Accuracy of contours and cross sections depends on flight height and accuracy of ground control.  • Generally, aerial photogrammetry cannot produce the same level of accuracy as traditional survey field methods.  **Accuracy and Errors**  Photogrammetric accuracy depends on two main factors, the desired scale of the photographyand the errors that are introduced during the photogrammetric process. The photo scale is dependent on the product specifications. The required accuracy can be met by using a small photo scale and high quality equipment or large scale photos with less accurate equipment.The photo scale should be smaller than the map scale however the ratio between the two scales shouldn’t be greater than eight. If one would assume that all blunders have been removed, then the remaining errors would be systematic errors and random errors. For example when it comes to the photogrammetric product of an Orthophoto, the components that contribute errors to the product are:  1.Camera (characteristics and calibration)  2.Scanner (characteristics, calibration, resolutionor image scale)  3.Ground control (accuracy, distribution, and abundance)  4.Aerial triangulation (design, measurement, and computation)  5.Digital Elevation Modeling(DEM) -(method of compilation; quality of the source material; characteristics of theterrain; sampling spacing, with or without breaklines; type of breaklines used; method of interpolation into pixel grid and availability of height information on or above surface features, such as buildings.)  6.Rectification process (method and software) When all of these errors are propagated and summed up following a valid error theory methodology, one can assess the spatial accuracy of the final product. **Digital elevation model** A **digital elevation model** (**DEM**) is a [3D CG](https://en.wikipedia.org/wiki/3D_computer_graphics) [representation](https://en.wikipedia.org/wiki/3D_modeling) of a [terrain](https://en.wikipedia.org/wiki/Terrain)'s surface – commonly of a [planet](https://en.wikipedia.org/wiki/Planet) (e.g. [Earth](https://en.wikipedia.org/wiki/Earth)), [moon](https://en.wikipedia.org/wiki/Moon), or [asteroid](https://en.wikipedia.org/wiki/Asteroid) – created from a terrain's [elevation](https://en.wikipedia.org/wiki/Elevation) data. A "global DEM" refers to a [discrete global grid](https://en.wikipedia.org/wiki/Discrete_global_grid).  DEMs are used often in geographic information systems, and are the most common basis for digitally produced relief maps. While a [digital surface model](https://en.wikipedia.org/wiki/Digital_surface_model) (DSM) may be useful for landscape modeling, city modeling and visualization applications, a [digital terrain model](https://en.wikipedia.org/wiki/Digital_terrain_model) (DTM) is often required for flood or drainage modeling, land-use studies, geological applications, and other applications, and in [planetary science](https://en.wikipedia.org/wiki/Planetary_science). |