

DAILY ASSESSMENT FORMAT

Date:	01/07/2020	Name:	Nichenametla Bhargavi
Course:	Satellite Photogrammetry and its applications	USN:	4AL17EC061
Topic:	Concepts of satellite photogrammetry	Semester & Section:	6th Sem A sec
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FORENOON SESSION DETAILS

Image of session



INDIAN INSTITUTE OF REMOTE SENSING, DEHRADUN

Science, Technology and Art of making precise measurements on *images produced by spaceborne imaging sensors* to derive reliable topographic information of the viewed *planetary surface*.

Advantages of imaging from space:

- * Synoptic view
- * Large swath, repeativity
- * Constant scale, near orthonormal projection
- * Negligible internal distortions
- * Stable radiometry
- * Formalities associated with aerial photography and flight arrangement are avoided here

General Workflow :

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graph TD
    A[Stereo satellite images] --> B[Sensor orientation mathematical model]
    B --> C[Generation of digital elevation model]
    C --> D[Feature extraction from anaglyph]
    E[GPS measurements] --> F[Ground control points]
    F --> B
    F --> G[Comparative analysis with other data sources]
    G --> D
  
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Report – Report can be typed or hand written for up to two pages.

Satellite Photography:

Branches of photogrammetry: There are two broad based branches in photogrammetry.

1. 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.

2. 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 data provides much essential and critical information for monitoring many applications such as image fusion, change detection, and land cover classification. Remote sensing is an important technique to obtain information relating to the Earth's resources and environment. What popularized satellite data are the easily accessed online mapping applications like Google Earth and Bing Maps.

*** Satellite Derived Bathymetry (SDB)** is being adopted as a cheaper and more spatially extensive method for bathymetric mapping than traditional acoustic surveys, with research being conducted by the Canadian Hydrographic Service under a Government Related Initiatives Program (GRIP) of the Canadian Space Agency.

*** Established SDB methods** involve either an empirical approach, where a regression between known depths and various color indexes is developed; or a physics-based Radiative Transfer Model (RTM) approach, where light interactions through the water column are simulated.

*** Both methods** have achieved vertical accuracies of around 1 m. However, the empirical approach is limited to areas with existing in-situ depth data, and has limited applicability in heterogeneous benthic environments, while the physics-based approach requires precise atmospheric correction.

- * This paper proposes a through-water photogrammetric approach which avoids these limitations, in heterogeneous seafloor environments, by using feature extraction and image geometry rather than spectral radiance to estimate bathymetry. The method is demonstrated in Coral Harbor, Nunavut, Canada using a WorldView-2 stereo pair.**
- * A standard photogrammetric extraction was performed on the stereo pair, including a blunder removal and noise reduction. Apparent depths were then calculated by referencing under-water points to the extracted elevation of the water-line. Actual in-image depths were calculated from apparent depths by applying a correction factor to account for the effects of refraction at the air-water boundary.**
- * A tidal reduction brought depths to local chart datum, allowing for validation with Canadian Hydrographic Service survey data showing a mean error of 0.031 m and an RMSE of 1.178 m. The method has a similar accuracy to the two established SDB methods, allowing for its use for bathymetric mapping in circumstances where the established methods are not applicable due to their inherent limitations.**
- * Photogrammetry is used in fields such as topographic mapping, architecture, engineering, manufacturing, quality control, police investigation, cultural heritage, and geology.**
- * Satellite images are one of the most powerful and important tools used by the meteorologist. They are essentially the eyes in the sky. These images reassure forecasters to the behavior of the atmosphere as they give a clear, concise, and accurate representation of how events are unfolding.**
- * Photogrammetry is primarily concerned with making precise measurements of three-dimensional objects and terrain features from two-dimensional photographs. ... Two general types of photogrammetry exist: aerial (with the camera in the air) and terrestrial (with the camera handheld or on a tripod).**
- * The Photogrammetry is a surveying and mapping technique which has several applications in the Transportation Department. The photogrammetric process consists of proper project planning, image retrieval, image processing, control data for image adjustment, data accumulation and presentation of an end product results.**

