**DAILY ASSESSMENT FORMAT**

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| **Course:** | IIRS Outreach Program on Satellite Photogrammetry | **USN:** | **4AL16EC030** |
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| **GitHub Repository:** | Karthik-J |  |  |

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| **FORENOON SESSION DETAILS** |
| **Image Section**          **Definition of Stereoscopy**  Stereoscopy, sometimes called stereoscopic imaging, is a technique used to enable a three dimensional effect, adding an illusion of depth to a flat image. In aerial photography, when two photographs overlap or the same ground area is photographed from two separate position forms a stereo-pair, used for three dimension viewing. Thus obtained a pair of stereoscopic photographs or images can be viewed stereoscopically. A stereoscope facilitates the stereoviewing process by looking at the left image with the left eye and the right image with the right eye. It is based on Porro-Koppe’s Principle that the same light path can be generated in an optical system if a light source is projected onto the image taken by an optical system. Stereoscopic vision is constructed with a stereopair images using the relative orientation or tilt at the time of photography. Stereo viewing allows the human brain to judge and perceive in depth and volume. 3D representation of the earth’s surface resulting in the collection of the geographic information with a greater accuracy compared to the monoscopic techniques.  **Stereoscopic Vision**  On our daily life we unconsciously perceive and measure depth using our eyes. This stereo effect is possible because we have two eyes or binocular vision. The perception of depth through binocular vision is referred to as stereoscopic viewing, which means viewing an object from two different locations. Monoscopic or monocular vision refers to viewing surrounding objects with only one eye. Depth is perceived primarily based on the relative sizes of objects, shadow; distant objects appear smaller and behind closer objects. In stereoscopic vision, objects are viewed with both eyes a little distant from each other (approximately 65 mm) helps in viewing objects from two different positions and angles, thus a stereoscopic vision is obtained. The angle between the lines of sight of two eyes with each object known as parallactic angle helps our brain in determining the relative distances between objects. Lesser the parallactic angle higher the objects depth. Figure 8.1 shows the human stereoscopic vision, parallactic angle Øa > Øb, helps the brain automatically to estimate the differences (Da - Db) in depths between the objects A and B. This concept of distance estimation in stereoscopic vision is applied to view a pair of overlapping aerial photograph.    **Fig. 8.1. Human stereoscopic vision.**  As an example, in two photographs overlap the same region, in which objects A, B and C are situated at the same altitude and object D at a different altitude, the four objects will be observed in a different sequence in the two photographs a, b, d, c in the left photograph and a, d, b, c in the right (Fig. 8.2). In the same photograph, segments ab and bc are equal since they are at the same altitude, but segments ad and dc are not (source: Girard, 2003).    **Fig. 8.2. Perception of relief from two aerial photographs.**  **(Source: Girard, 2003)**  **8.3 Stereoscopes**  A stereoscope is used in conjunction with two aerial photographs taken from two different positions of the same area, (known as a stereo-pair) to produce a 3-D image. There are two types of stereoscopes: lens (or pocket) stereoscope and mirror stereoscope. Lens (or pocket) stereoscope has a limited view and therefore restricts the area that can be inspected where as in mirror stereoscope has wide view and enables a much larger area to be viewed on the stereo-pair. The most obvious feature when using a stereoscope is the enhanced vertical relief. This occurs because our eyes are only 65mm apart, but the air photos may be taken at 100s of meters apart, hence the difference in exposures is far greater than the difference between our eyes. Such an exaggeration also enables small features to become quite apparent and easily viewed. 3D digital stereophotogrammetry The use of 3D surface imaging technology is becoming increasingly common in craniofacial clinics and research centers. Due to fast capture speeds and ease of use, 3D digital stereophotogrammetry is quickly becoming the preferred facial surface imaging modality. These systems can serve as an unparalleled tool for craniofacial surgeons, proving an objective digital archive of the patient's face without exposure to radiation. Acquiring consistent high-quality 3D facial captures requires planning and knowledge of the limitations of these devices. Currently, there are few resources available to help new users of this technology with the challenges they will inevitably confront. To address this deficit, this report will highlight a number of common issues that can interfere with the 3D capture process and offer practical solutions to optimize image quality.  **GIS**  **Definition**  A geographic information system (GIS) is basically a computerized information system like any other database, but with an important difference: all information in GIS must be linked to a geographic (spatial) reference (latitude/longitude, or other spatial coordinates). |