1.what is photograph?

**Answer—**A photograph refers to specifically to images that have been detected as well as recorded on photographic film. Photos are normally recorded over the wavelength range from 0.3 μm to 0.9 μm - the visible and reflected infrared.

2. what is pixels?

**Answer---** A photograph could also be represented and displayed in a **digital** format by subdividing the image into small equal-sized and shaped areas, called picture elements or **pixels**, and representing the brightness of each area with a numeric value or **digital number**.The photograph was scanned and subdivided into pixels with each pixel assigned a digital number representing its relative brightness. The computer displays each digital value as different brightness levels.

3.what do you mean by channels?

**Answer---** The information from a narrow wavelength range is gathered and stored in a **channel**, also sometimes referred to as a **band**. We can combine and display channels of information digitally using the three primary colours (blue, green, and red). The data from each channel is represented as one of the primary colours and, depending on the relative brightness (i.e. the digital value) of each pixel in each channel, the primary colours combine in different proportions to represent different colours.

**Question 1. What is Flight line?**

**Answer:--**When obtaining vertical aerial photographs, the aircraft normally flies in a series of lines, each called a **flight line**. Photos are taken in rapid succession looking straight down at the ground, often with a 50-60 percent overlap (A) between successive photos.

**2.Stereoscoping viewing**;-- The overlap ensures total coverage along a flight line and also facilitates **stereoscopic viewing**. Successive photo pairs display the overlap region from different perspectives and can be viewed through a device called a **stereoscope** to see a three-dimensional view of the area, called a **stereo model**. Many applications
of aerial photography use stereoscopic coverage and stereo viewing.

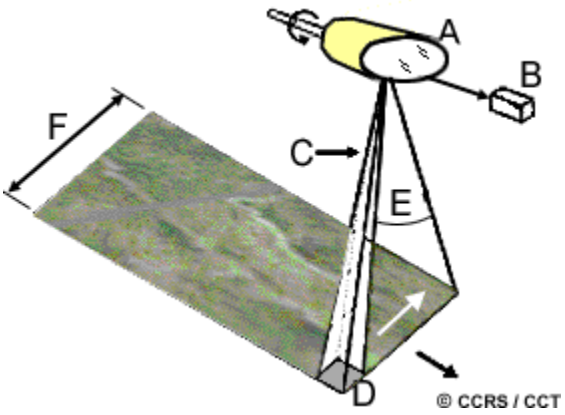
## ●Application of aerial photographs;--Aerial photographs are most useful when fine spatial detail is more critical than spectral information, as their spectral resolution is generally coarse when compared to data captured with electronic sensing devices. The geometry of vertical photographs is well understood and it is possible to make very accurate measurements from them, for a variety of different applications (geology, forestry, mapping, etc.). The science of making measurements from photographs is called **photogrammetry** and has been performed extensively since the very beginnings of aerial

photography. Photos are most often interpreted manually by a human analyst (often viewed stereoscopically). They can also be scanned to create a digital image and then analyzed in a digital computer environment.

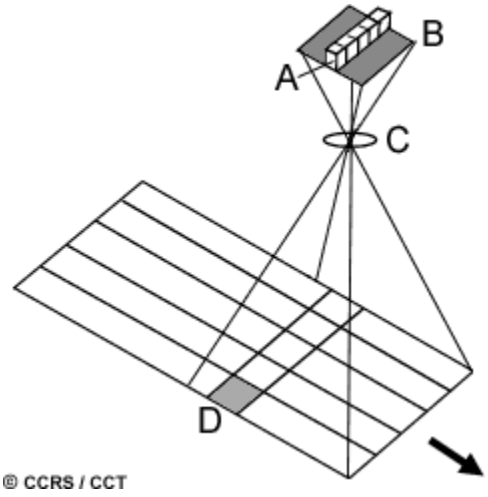
**1.Multiband photography** uses multi-lens systems with different film-filter combinations to acquire photos simultaneously in a number of different spectral ranges. The advantage of these types of cameras is their ability to record reflected energy separately in discrete wavelength ranges, thus providing potentially better separation and identification of various features.

**2.Multispectral Scanning:--** A scanning system used to collect data over a variety of different wavelength ranges is called a **multispectral scanner (MSS)**, and is the most commonly used scanning system. There are two main modes or methods of scanning employed to acquire multispectral image data - **across-track scanning**, and **along-track scanning**.

**Across-track scanners** scan the Earth in a series of lines. The lines are oriented perpendicular to the direction of motion of the sensor platform (i.e. across the swath).



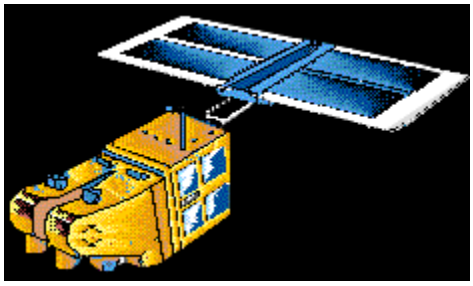

**Along-track scanners** also use the forward motion of the platform to record successive scan lines and build up a two-dimensional image, perpendicular to the flight direction. However, instead of a scanning mirror, they use a linear array of detectors (A) located at the focal plane of the image (B) formed by lens systems (C), which are "pushed" along in the flight track direction (i.e. along track). These systems are also referred to as **pushbroom scanners**, as the motion of the detector array is analogous to the bristles of a broom being pushed along a floor. Each individual detector measures the energy for a single ground resolution cell (D) and thus the size and IFOV of the detectors determines the spatial resolution of the system. A separate linear array is required to measure each spectral band or channel. For each scan line, the energy detected by each detector of each linear array is sampled electronically and digitally recorded.



Question1. Short notes on GEOS ?
Answers:--- The full form of GEOS is Geostationary Operational Environmental Satellite. This System is the follow-up to the ATS series. They were designed by NASA for the National Oceanic and Atmospheric Administration (NOAA) to provide the United States National Weather Service with frequent, small-scale imaging of the Earth's surface and cloud cover. The GOES series of satellites have been used extensively by meteorologists for weather monitoring and forecasting for over 20 years. These satellites are part of a global network of meteorological satellites spaced at approximately 70° longitude intervals around the Earth in order to provide near-global coverage. Two GOES satellites, placed in **geostationary orbits** 36000 km above the equator, each view approximately one-third of the Earth. One is situated at 75°W longitude and monitors North and South America and most of the Atlantic Ocean. The other is situated at 135°W longitude and monitors North America and the Pacific Ocean basin.

Two generations of GOES satellites have been launched, each measuring emitted and reflected radiation from which atmospheric temperature, winds, moisture, and cloud cover can be derived. The first generation of satellites consisted of GOES-1 (launched 1975) through GOES-7 (launched 1992). The second generation of satellites began with GOES-8 (launched 1994) and has numerous technological improvements over the first series. They provide near-continuous observation of the Earth allowing more frequent imaging (as often as every 15 minutes). This increase in temporal resolution coupled with improvements in the spatial and radiometric resolution of the sensors provides timelier information and improved data quality for forecasting meteorological conditions.GOES-8 and the other second generation GOES satellites have separate **imaging** and **sounding** instruments

## Question 1: short note on SPOT



**SPOT** (Système Pour l'Observation de la Terre) is a series of Earth observation imaging satellites designed and launched by CNES (Centre National d'Études Spatiales) of France, with support from Sweden and Belgium. SPOT-1 was launched in 1986, with successors following every three or four years. All satellites are in sun-synchronous, near-polar orbits at altitudes around 830 km above the Earth, which results in orbit repetition every 26 days. They have equator crossing times around 10:30 AM local solar time. SPOT was designed to be a commercial provider of Earth observation data, and was the first satellite to use along-track, or pushbroom scanning technology.

The SPOT satellites each have twin **high resolution visible (HRV)** imaging systems, which can be operated independently and simultaneously. Each HRV is capable of sensing either in a high spatial resolution single-channel **panchromatic (PLA)** mode, or a coarser spatial resolution three-channel **multispectral (MLA)** mode. Each along-track scanning HRV sensor consists of four linear arrays of detectors: one 6000 element array for the panchromatic mode recording at a spatial resolution of 10 m, and one 3000 element array for each of the three multispectral bands, recording at 20 m spatial resolution. The swath width for both modes is 60 km at nadir. The accompanying table illustrates the spectral characteristics of the two different modes.

## About IRS:---

The Indian Remote Sensing (IRS) satellite series, combines features from both the Landsat MSS/TM sensors and the SPOT HRV sensor. The third satellite in the series, IRS-1C, launched in December, 1995 has three sensors: a single-channel panchromatic (PAN) high resolution camera, a medium resolution four-channel Linear Imaging Self-scanning Sensor (LISS-III), and a coarse resolution two-channel Wide Field Sensor (WiFS). The accompanying table outlines the specific characteristics of each sensor.

### Q.What is the full form of CASI?

Answer;--CASI Is **Compact Airborne Spectrographic Imager**. It is a leader in airborne imaging, being the first commercial imaging spectrometer.The spectral range covered by the 288 channels is between 0.4 and 0.9 μm. Each band covers a wavelength range of 0.018 μm.

### Question Short notes on MOS

Answer:---The first Marine Observation Satellite (MOS-1) was launched by Japan in February, 1987 and was followed by its successor, MOS-1b, in February of 1990. These satellites carry three different sensors: a four-channel Multispectral Electronic Self-Scanning Radiometer (MESSR), a four-channel Visible and Thermal Infrared Radiometer (VTIR), and a two-channel Microwave Scanning Radiometer (MSR), in the microwave portion of the spectrum.

The MESSR bands are quite similar in spectral range to the Landsat MSS sensor and are thus useful for land applications in addition to observations of marine environments. The MOS systems orbit at altitudes around 900 km and have revisit periods of 17 days.

Short notes on SeaWiFS

Answer:-- of various **The Sea WiFS (Sea-viewing Wide-Field-of View Sensor) on board the SeaStar spacecraft is an advanced sensor designed for ocean monitoring. It consists of eight spectral bands of very narrow wavelength ranges tailored for very specific detection and monitoring ocean phenomena.**

Question : what is Lidar?

Answer;--- Lidar is an acronym for LIght Detection And Ranging, an active imaging technology very similar to RADAR (see next paragraph)

Q.Short note on RADAR?

Answer:--- RADAR stands for RAdio Detection And Ranging. **RADAR systems are active sensors which provide their own source of electromagnetic energy. Active radar sensors, whether airborne or spaceborne, emit microwave radiation in a series of pulses from an antenna, looking obliquely at the surface perpendicular to the direction of motion. When the energy reaches the target, some of the energy is reflected back towards the sensor. This backscattered microwave radiation is detected, measured, and timed. The time required for the energy to travel to the target and return back to the sensor determines the distance or range to the target. By recording the range and magnitude of the energy reflected from all targets as the system passes by, a two-dimensional image of the surface can be produced. Because RADAR provides its own energy source, images can be acquired day or night. Also, microwave energy is able to penetrate through clouds and most rain, making it an all-weather sensor. Because of the unique characteristics and applications of microwave remote sensing, Chapter 3 covers this topic in detail, concentrating on RADAR remote sensing**