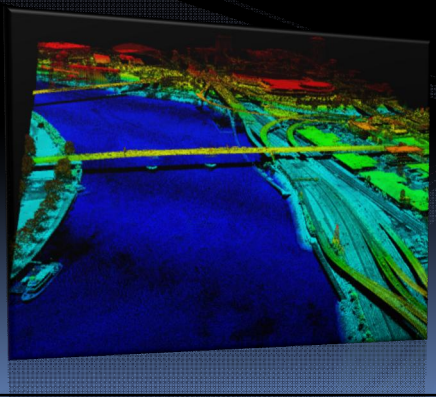
Airborne Laser Scanning

"ALS"



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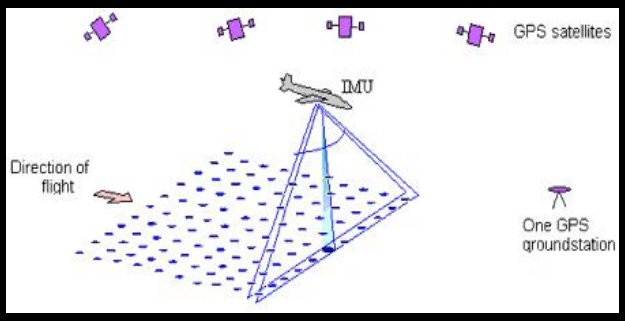
Ryan Lynch

"ALS" designates the acquisition of 3D data by means of one or more laser scanners combined with a position and attitude measurement system on a platform to be carried by an aircraft.

CONSIDERATIONS:

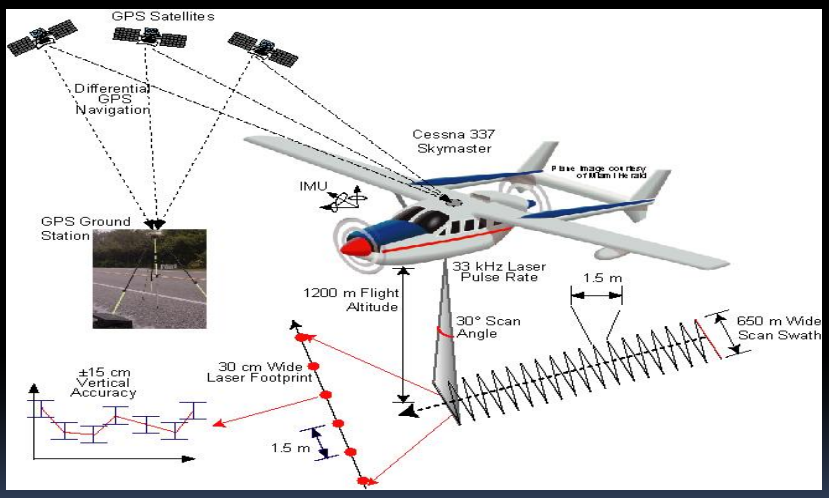
- time efficient data acquisition over large areas
- automatic registration of 3D data in a common coordinate system
- high accuracy and resolution of registered data

An ALS system consists of 4 main components



- An Inertial Measurement Unit (IMU) to record the aircraft attitude & acceleration
- A GPS to position the moving aircraft in space. (including a ground based station)
- A laser light source directing a stream of discrete laser points at approx. 90° to the line of flight
- A Computer OS & software to control data collection and storage

Components & Accuracy



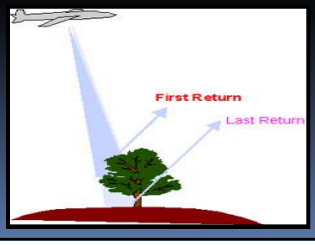
Wavelength of the laser = 1040 – 1060 nm

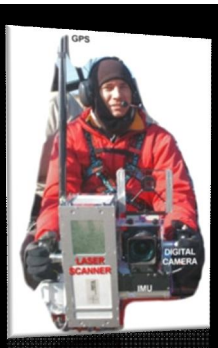
Relative accuracy of ALS points = 3cm - 5cm

ALS regularly achieves Absolute accuracy of 15cm in height & 30cm in position

Time of Flight 3D Scanner

- Laser rangefinder calculates distance by timing round trip of laser pulse
- $(c \cdot t)/2$ *where* c = *speed of light*
  t = *round trip time*
- measure between 10,000 – 100,000 points per second
- First & last returns acquired in the same pass
- Data from GPS base station utilized for computation of differential GPS equation





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